

Evaluation of the Maternal Mental Health Program

A Thesis Submitted to the Faculty of Graduate Studies and Research

in Partial Fulfilment of the Requirements

for the Degree of

Master of Public Health

in the School of Public Health

University of Saskatchewan

Saskatoon

By

Hua Li

© Copyright Hua Li, December 2012. All rights reserved.

PERMISSION TO USE

In presenting this thesis in partial fulfilment of the requirements for a graduate degree from the University of Saskatchewan, I agree that the libraries of this University may make it freely available for inspection. I further agree that permission for copying this thesis in any manner, in whole or in part, for scholarly purpose may be granted by the professor who supervised my thesis work, or in her absence, by the Head of the Department or the Dean of the College in which my thesis or work was done. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be of any material in my thesis.

Request for permission to copy or to make other use of material in this thesis in whole or part should be addressed to:

Head of the School of Public Health
University of Saskatchewan
Health Science Building, 107 Wiggins Road
Saskatoon, SK S7N 5E5
Canada

ABSTRACT

According to the World Health Organization, mental health problems, particularly depression and anxiety, are increasing worldwide; this places a huge burden on individuals, families, and society. Maternal depression has drawn a lot of attention during the last two decades because maternal depression affects not only the women, but also their unborn children and/or newborns. However, the majority of women who suffer from maternal depression do not seek help. When the women seek help, they are often under-diagnosed or under-treated by their family physicians.

The shared care model has been implemented in a variety of health care settings including mental health. Shared care enhances collaboration between family physicians and specialists in delivering patient care. The Maternal Mental Health Program (MMHP) is a shared care program, and was developed to improve the mental health of pregnant and postpartum women in the Saskatoon Health Region. In comparison to other shared care programs reported in the literature, the MMHP is focused exclusively on maternal mental health.

To evaluate the MMHP, a quantitative evaluation was conducted to examine the implementation and maintenance of the program. Based on the findings, there was a significant reduction of depression and anxiety symptoms among women who completed the program. This study revealed that social determinants of health are associated with the level of symptoms. Overall, the program met women's and physician's expectations, with 75 women (75.8%) and 75 physicians (76.5%) being satisfied or very satisfied with the program. This evaluation study suggests that implementation and maintenance of a shared care maternal mental health program are possible and effective in a local setting, and, in order to improve maternal mental health, social determinants of health have to be addressed.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my supervisor Dr. Angela Bowen for her tremendous guidance, encouragement, knowledge and support throughout this process, and my co-supervisor Dr. John Moraros for his time, valuable guidance, expertise, and support. I would also like to thank the members of my advisory committee, Dr. Michael Szafron, and Dr. Nazeem Muhajarine, and my Committee Chair Dr. George Mutwiri for their expertise, suggestions, and support to complete my study. My thanks also go to my external examiner, Dr. Melanie Morrison.

I would like to thank the faculty and staff of the School of Public Health at the University of Saskatchewan, and my colleagues at the Dubé Centre for Mental Health in the Royal University Hospital for their friendly support throughout my study. I would also like to thank Dr. Lloyd Balbuena for his expertise and assistance. My appreciation also goes to Lindsay Tumback who assisted me in editing this thesis.

Special thanks goes to my beloved family, my mother, brothers, and sister for their understanding and endless love.

This thesis is dedicated to my father, Shuzhao Li, who made me who I am today; to my husband, Junyuan Ma, who has kept me grounded; and to my son, Aoxiang Ma, who has made me a better person.

TABLE OF CONTENTS

PERMISSION TO USE.....	i
ABSTRACT.....	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES IN MANUSCRIPT	vi
LIST OF FIGURES	vii
LIST OF FIGURES IN MANUSCRIPT	vii
LIST OF ABBREVIATIONS	viii
CHAPTER 1 INTRODUCTION.....	1
1.1 The Maternal Mental Health Program	1
1.2 Quantitative Evaluation.....	3
1.3 Thesis Structure Overview	5
CHAPTER 2 LITERATURE REVIEW.....	6
2.1 Depression.....	6
2.1.1 Prevalence of depression	6
2.1.2 Diagnosis and treatment of depression.....	7
2.2 Maternal Depression	7
2.2.1 Antenatal depression	8
2.2.2 Postpartum depression.....	8
2.2.3 The relationship between antenatal and postpartum depression	8
2.2.4 Impact of antenatal depression	9
2.2.5 Impact of postpartum depression.....	10
2.2.6 The role of hormones in maternal depression	10
2.2.7 Risk factors for maternal depression	11
2.2.7.1 Social support	11
2.2.7.2 Life events	11
2.2.7.3 Socio-economic status (SES)	12
2.2.7.4 Demographic factors	12
2.2.7.5 History of depression and family history of mental illness	14
2.2.7.6 Self-reported mental health and self-reported general health.....	14

2.2.7.7 Obstetric and infant factors	15
2.3 Anxiety	16
2.3.1 Prevalence of anxiety	16
2.3.2 Diagnosis and treatment of anxiety	17
2.4 Maternal Anxiety.....	17
2.4.1 Anxiety in pregnancy and postpartum.....	17
2.4.2 Impact of maternal anxiety	18
2.5 Comorbidity of Depression and Anxiety	19
2.6 Shared Care Model of Health Care	20
2.6.1 Definition of shared care	20
2.6.2 Shared care models	20
2.6.3 Benefits and challenges of shared care.....	22
2.7 Chapter Summary.....	23
CHAPTER 3 MANUSCRIPT: Evaluation of the Maternal Mental Health Program	25
CHAPTER 4 IMPLICATIONS AND CONCLUSIONS.....	61
4.1 Implications	61
4.1.1 Addressing social determinants of health.....	61
4.1.2 Screening maternal depression and anxiety	62
4.2 Knowledge Translation and Exchange.....	62
4.3 Future Research.....	63
4.4 Conclusions	63
REFERENCES.....	65
APPENDICES	81

LIST OF TABLES IN MANUSCRIPT

Table 1: Socio-demographic information of women	36
Table 2: Physicians' gender, years of practice, and medical specialty	37
Table 3: Changes in EPDS/EPDS Anxiety Subscale mean scores from intake to evaluation.....	38
Table 4: Chi square association test results: depression and independent variables	40
Table 5: Chi square association test results: anxiety and independent variables.....	41
Table 6: Chi square association test results: anxiety and independent variables.....	42
Table 7: Logistic regression: significant variables associated with depression and anxiety	43

LIST OF FIGURES

Figure 1: Program Logic Model – Maternal Mental Health Program (MMHP)4

LIST OF FIGURES IN MANUSCRIPT

Figure 1: Women’s satisfaction with and expectations of the MMHP45

Figure 2: Physician satisfaction with and expectations of the MMHP47

LIST OF ABBREVIATIONS

APA	The American Psychiatric Association
BF	Breast feeding
CCHS	Canadian Community Health Survey
CI	Confidence intervals
DSM	The Diagnostic and Statistical Manual of Mental Disorders
EPDS	The Edinburgh Postnatal Depression Scale
Exp (β)	Exponentiation of the β coefficient, which is an odds ratio
M	Mean
MMHP	Maternal Mental Health Program
MSSS	The Maternal Social Support Scale
P	p-value. A p-value is the probability that the computed value of a test statistic is at least as extreme as a specified value of the test statistic when the null hypothesis is true. Thus, the p-value is the smallest value of α for which we can reject a null hypothesis.
PPD	Postpartum depression
SD	Standard deviation
SES	Socio-economic status
SHR	Saskatoon Health Region
WHO	The World Health Organization

CHAPTER 1: INTRODUCTION

This thesis is presented in manuscript format as partial fulfillment of the requirements for the Degree of Masters of Public Health from the University of Saskatchewan. The purpose of the study was to evaluate the Maternal Mental Health Program (MMHP), a local shared care program within the Saskatoon Health Region (SHR), Saskatchewan, Canada.

The MMHP was initiated in 2006 and primarily focused on maternal mental health, particularly maternal depression and anxiety. A quantitative evaluation of the MMHP was conducted in 2011 as a component of this thesis. The evaluation examined changes in depression and anxiety symptoms among women who completed the program and women's and referring physicians' and other practitioners' satisfaction with the MMHP. Additionally, the study explored the risk factors that are associated with maternal depression and anxiety among the women.

It is hoped that the findings from this study will positively influence the overall quality of care offered by the MMHP, enhance the collaboration between different disciplinary health care team members, and improve delivery care to maternal mental health patients.

1.1 The Maternal Mental Health Program

The MMHP was developed to improve the mental health of pregnant and postpartum women in the SHR. The MMHP was originally entirely located within the West Winds Primary Health Centre in Saskatoon, Saskatchewan, Canada. West Winds Primary Health Centre is an academic family medicine setting that is able to provide medical students, family medicine residents, and other health professionals the opportunity to gain knowledge and the skills required to effectively identify and treat maternal mental health problems. The MMHP offers women consultation with a psychiatrist, a clinical health psychologist, and a nurse therapist. The

program staff are available to consult with, and to support family physicians or other health care practitioners in the community (Bowen et al., 2008).

I am a Registered Nurse, and have worked in an acute mental health facility in Royal University Hospital (in Saskatoon) since 2008. Some of my patients suffered from antenatal or postpartum depression. I have seen firsthand their struggle to manage their depression in the community and, without specialized care, their symptoms deteriorated until they had to be admitted for acute care. I believe that there is a need for an outpatient program that delivers continuity of care with a high degree of competency to women with mental health problems within our community. My passion for mental health motivated me to get involved in the MMHP and to use it as my research project for my Masters in Public Health.

In 2011, I attended a MMHP session at the West Winds Primary Health Centre, and observed an initial assessment of two patients with antenatal depression. The patients were informed by the psychiatrist that the interview would be observed by health care students and professionals. One medical student observed the assessment of the first patient while a psychiatrist (specialized in mood disorder) interviewed the patient. The same medical student interviewed the second patient jointly with the psychiatrist. I observed the process along with one family medicine resident and several medical students in a screen room via a two-way mirror. There was also an experienced Registered Psychiatric Nurse and a nursing student in the room. The nurse and the nursing students took notes and discussed the possibility of either referring the patients to educational and support groups, or making other referrals to other professionals, such as, a psychologist or a social worker.

This experience has made me realize that the MMHP takes a multidimensional approach that not only includes mental health assessment, diagnosis, and treatment, but also the utilization

of health care resources, and mentoring of health care students and professionals.

Before the MMHP started, the MMHP working group created a program logic model that presented a blueprint description of the intended program. The logic model includes both short-term and long-term goals, process objectives, the target population, activities, and resources related to the program (Issel, 2009). An abbreviated version of the program's comprehensive logic model is presented in Figure 1 (Bowen et al., 2008).

1.2 Quantitative Evaluations

The MMHP was established in September 2006. After five years of operation, the MMHP underwent a quantitative evaluation as a component of this study, which was based on three research questions:

1. Have the products and programs of the MMHP helped reduce the symptoms of depression and anxiety in pregnant and postpartum women?
2. What are the risk factors associated with maternal depression and anxiety in the present population?
3. Have the products and programs of the MMHP met the expectations of women attending the program and referring physicians and other health care practitioners?

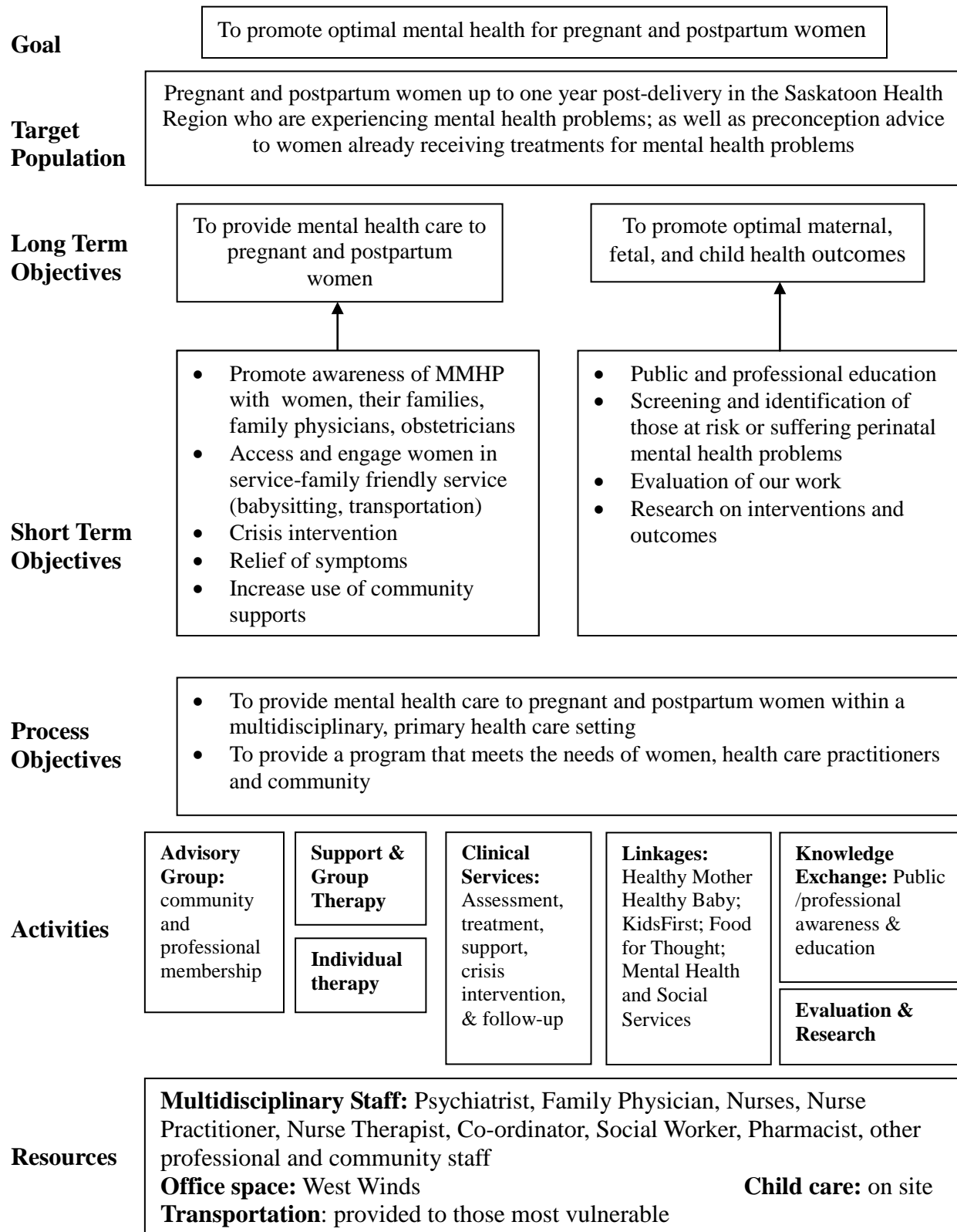


Figure 1. Program Logic Model – Maternal Mental Health Program (MMHP)

1.3 Thesis Structure Overview

As there are no Appendices in the manuscript, the following is a list of appendices used in the study:

Appendix A: The Edinburgh Postnatal Depression Scale (EPDS), the Maternal Social Support Scale (MSS), and the Maternal Mental Health Program Intake Questionnaire

Appendix B: The Maternal Mental Health Program Evaluation Questionnaire

Appendix C: Family Physician Survey Questionnaire

This thesis is comprised of the following sections: Chapter 1 Introduction, Chapter 2 Literature Review, Chapter 3 Manuscript, Chapter 4 Implications and Conclusions, References, and Appendices A through D. Chapter 2 summarizes the critical points of current knowledge, including substantive findings. It includes sections regarding the prevalence of maternal depression and anxiety, the impact of maternal depression and anxiety, the treatment for depression and anxiety, the risk factors for developing maternal depression and anxiety, comorbidity of depression and anxiety, as well as the shared care model of health care. Chapter 3 consists of a manuscript that contains the following sections: abstract, introduction, methods, results, discussion, limitations, conclusions, and references. The final chapter of the thesis presents the implications of the present study, future research, and the conclusions. Finally, an overall reference list and corresponding appendices are provided.

CHAPTER 2: LITERATURE REVIEW

This chapter reviews scientific literature related to maternal mental health with specific focus on depression, maternal depression, anxiety, maternal anxiety, diagnosis, treatment, impact of maternal depression and anxiety, and comorbidity of depression and anxiety. Relevant literature about the shared care model in practice, including examples of the model, and its benefits and challenges is also reviewed.

2.1 Depression

Depression is a mental health disorder (American Psychiatric Association, 2000). According to the American Psychiatric Association (APA) (2000), the presence of depression is characterised by low mood, loss of interest or pleasure, feelings of guilt or worthless, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, diminished ability to think or concentrate, and recurrent thoughts of death or suicidal ideation.

2.1.1 Prevalence of depression

The World Health Organization (WHO) ranks depression as the fourth leading cause of disability worldwide and projects that by 2020, it will be the second leading cause (Murray & Lopez, 1996). According to the Mental Health and Well-being Survey, a component of the Canadian Community Health Survey (CCHS) (Statistics Canada, 2002), depression has become a major public health issue in Canada. Of those surveyed, 12.2% of participating adults identified that at some point during their lifetime, they exhibited symptoms that met the criteria for depression.

Studies have consistently documented higher rates of depression among women than among men: the female-to-male ratio averages 2:1 (Canadian Psychiatric Association, 2001) and have reported a lifetime risk of 7-12 % for men and 20-25 % for women (WHO, 2012). These

rates are independent from race, education, income, or social status (WHO) which makes depression one of the most common medical illnesses.

2.1.2 Diagnosis and treatment

The diagnosis of major depression is made on the basis of a careful clinical interview and mental status examination (APA, 2000). The criteria in the Diagnostic and Statistical Manual of Mental Disorders (DSM) - IV are generally considered the standard diagnostic approach (APA). According to practice guidelines for the treatment of patients with a major depression disorder (APA), the treatment includes pharmacotherapy, somatic therapies, psychotherapy, a combination of medications and psychotherapy, and complementary and alternative therapies.

Under-diagnosis and under-treatment of depression have been major issues in mental health care (Jameson & Blank, 2010). A study of 11, 658 participants from the US 2006 National Ambulatory Medical Care Survey showed that in the primary care setting, about one-tenth to one-third of patients were diagnosed and, for those already diagnosed with depression, one-third did not receive treatment recommendations from their care providers (Jameson & Blank, 2010).

Researchers have examined depression across all stages of life. However, over the last few decades, a great deal of research has focused on maternal depression, including antenatal and postpartum depression.

2.2 Maternal Depression

Maternal depression is defined as the condition of women experiencing depressive symptoms during their pregnancy and postpartum (Tompson et al., 2010). This section reviews definition of antenatal and postpartum depression, the relationship between antenatal and

postpartum depression, impact of antenatal and postpartum depression, the role of hormones in maternal depression, and risk factors for maternal depression.

2.2.1 Antenatal depression

Depression occurring in any stage of pregnancy is defined as antenatal depression. Antenatal depression affects 10–20% of pregnant women (Evans et al., 2001; Marcus, Flynn, Blow, & Barry, 2003). Antenatal depression is known to be associated with a greater risk for negative pregnancy outcomes (Wisner et al., 2000), such as increased risk of preterm birth, low birth weight, and increased failure to thrive (Drewett, Blair, Emmett, & Emond, 2004),

2.2.2 Postpartum depression

Postpartum depression (PPD) is a major depression disorder affecting 10 to 15% of women with a prevalence of self-report postpartum depressive symptoms ranging from 12 to 20% (Centers for Disease Control and Prevention, 2008). According to the DSM IV (American Psychiatric Association, 2000), the first major depressive episode of PPD occurs within four weeks of delivery. Women can be depressed as early as two days postpartum or as late as one year postpartum, with the peak occurring between four and twelve weeks after birth (Flores & Hendrick, 2002; Teissèdre & Chabral, 2004).

2.2.3 The relationship between antenatal and postpartum depression

Some researchers have reported that depression is as common during pregnancy as it is postpartum (Evans et al., 2001; Josefsson et al., 2001; Kitamura et al., 1996). In a 2006 study conducted by Kammerer, Taylor, and Glover, 9.1% of women were depressed at eight weeks postpartum while 13.6% of women were depressed at 32 weeks gestation.

Studies have shown that a history of mental health problems is a predictor of depression in pregnancy and postpartum (Robertson, Grace, Wallington, & Stewart, 2003). Antenatal

depression and anxiety during pregnancy are significant predictors of postpartum depression according to a meta-analysis of 84 studies (Beck, 2001). Llewellyn et al. (1997) and O'Hare and Swain (1996) reported that the strongest predictor of postpartum depression was antenatal depression. Approximately one third of women who experienced postpartum depression had antenatal depression during their pregnancy (Murray & Cox, 1990; Green & Murray, 1994).

2.2.4 Impact of antenatal depression

Barker's theory of the "fetal origins of adult disease" (1995), hypothesized that the prenatal environment can affect fetal health that lasts into their adulthood. Studies have shown that maternal stress can influence the fetus directly, through transport of neuropeptides, and indirectly, through alterations in maternal-fetal blood flow (Wadhwa, Sandmon, & Garite, 2001; Myers, 1975). The prolonged effect of maternal stress on the hypothalamic-pituitary-adrenal axis of the fetus can influence the neurotransmitter and hormonal levels in adults that are related to depression (Bellingham -Young & Adamson - Macedo, 2003; Vieten & Astin, 2008).

Untreated depression during pregnancy has many negative implications for women, including decreased prenatal care, decreased self-care, an increased engagement in risky behaviours by the mother, such as, substance use, drinking and smoking (Einarson & Koren, 2007), and an increased risk of pre-eclampsia (Kurki, Raitasalo, Mattila, & Ylikorkala, 2000). For the fetuses and babies, untreated depression can lead to an increased risk of preterm birth, low birth weight and intrauterine growth restriction (Grote, et al., 2010), increased failure to thrive (Drewett, Blair, Emmett, & Emond, 2004), developmental delays, and language and behaviour problems in older children (Glover, Teixeira, Gitau, & Fisk, 1999; Wilkerson, Volpe, Dean, & Titus, 2002). Other negative consequences of untreated depression during pregnancy include lower rates and shorter duration of breastfeeding (Henderson, Evans, Straton, Priest, &

Hagan, 2003), and insecure attachment between mother and infant (Wan & Green, 2009).

2.2.5 Impact of postpartum depression

Postpartum depression can be problematic for the entire family. The partners of women with PPD are 50% more likely to be depressed themselves (Goodman, 2004). Children of depressed mothers experience more psychopathological, feeding, sleeping, attachment, growth and developmental, emotional, and behavioural problems (Lieb, Isensee, Hofler, Pfister, & Hu, 2002; Murray, Cooper, & Hipwell, 2003; Murray & Cooper, 2003; Murray & Cooper, 1997; Pearlstein, Howard, Salisbury, & Zlotnick, 2009; Weissman et al., 2004).

If PPD is not treated, it can lead to postpartum psychosis, which occurs in one out of every 500 mothers (Pearlstein, Howard, Salisbury, & Zlotnick, 2009). Women with postpartum psychosis may experience hallucinations, delusions, confusion, disorganized behaviour, poor judgement, and impaired functioning. Consequently, the women may put themselves and their children in harm's way (Kornstein & Clayton, 2002; Mauthner, 2002; Pearlstein, Howard, Salisbury, & Zlotnick).

2.2.6 The role of hormones in maternal depression

During pregnancy and the postpartum period, women's bodies change significantly. There are substantial changes in a range of psychoactive hormones, with large increases of estrogen, progesterone, and cortisol by the end of pregnancy, and a precipitous drop immediately after giving birth (Lommatzsch et al., 2006). Estrogen, which helps regulate the serotonin system, decreases sharply right after giving birth, and has been strongly associated with affective disorders such as depression and anxiety (Ostlund et al., 2003). At the end of a normal pregnancy, cortisol levels reach a reference point that has been found to be associated with major depression (Magiakou et al., 1997).

2.2.7 Risk factors for maternal depression

Risk factors for developing maternal depression have been well researched in the past several decades. Such studies have concentrated on social support, stressful life events, socio-economic and demographic factors, psychological and psychiatric factors, and obstetric factors associated with maternal depression as well as the pregnancy and infant outcomes related to maternal depression.

2.2.7.1 Social support

Social support is the physical and emotional comfort given to a woman by her family, friends, co-workers and others. Social support is closely related to the concept of a social network: the ties to family, friends, colleagues, neighbours, and other significant people in a person's life (Ettorre, 2010). There are different types of social support, such as emotional support (expressions of love and caring), informational support (providing advice and guidance), and instrumental support (financial and other assistance) (Ettorre).

Social support during pregnancy and postpartum has generated a lot of interest among researchers. Studies consistently show social support as a major or moderating factor in developing maternal depression (Cheng & Pickler, 2009; Robertson et al., 2004). According to Cheng and Pickler, mothers who received or perceived having social support, reported not only experiencing less depressive symptoms, but also reported having good general health. On the other hand, mothers who were single or who had non-supportive spouses or significant others were at more risk of developing maternal depression (Yonkers et al., 2001).

2.2.7.2 Life events

The relationship between stressful life events and the onset of depression is well established. Experiences of stressful life events (such as the death of a loved one, relationship

breakdown or divorce, or losing a job), can trigger depressive episodes in individuals who do not have a previous history of mood disorders (Robertson et al., 2004). Because pregnancy and birth can be interpreted as a stressful event in a woman's life, it may lead to depression (Holmes & Rahe, 1965).

In a meta-analysis of risk factors associated with PPD, O'Hara and Swain (1996) found that stressful life events are strongly (effect size) or moderately (effect size) related to developing postpartum depression. However, there are different associations depending on where the study is conducted. Interestingly, while studies conducted in North America and the United Kingdom showed that recent life events are significantly associated with postpartum depression, no strong association was found in studies of Asian women (Lee, Yip, Leung, & Chung, 2006).

2.2.7.3 Socio-economic status (SES)

Socio-economic status (SES) includes income, education and employment status. Studies show that women, who experienced financial hardship, unemployment, and lower education attainment, were more prone to develop depression during their pregnancy and after giving birth (Boyce, 2003; Goyal, Murphy, Cohen, 2006; Rich-Edwards et al., 2006; Ritter et al., 2000). In a study conducted by Rich-Edwards et al., financial hardship was associated with a threefold increase in risk of developing postpartum depression, whereas employment status was not considered a significant risk predictor for antenatal or postpartum depression. A meta-analysis conducted by O'Hara and Swain (1996) found that SES has a small (effect size) but is a significant risk factor associated with developing postpartum depression across different cultures and countries.

2.2.7.4 Demographic factors

In this study several demographic factors were examined as possible risk factors for

developing maternal depression. These demographic factors included age, marital status, relationship with partner, and ethnicity.

Age. Adolescent mothers have been shown to have significantly higher anxiety scores when compared to mothers aged over 20 (Quinlivan et al., 2004-thesis). Rich-Edwards et al., (2006) found that antenatal depression is significantly associated with young age (< 23), but after controlling for household income, the association of maternal age and antenatal depressive symptoms decreased. Two meta-analytic studies also found that maternal age was not associated with postpartum depression (Beck, 2001; O'Hara & Swain, 1996). Whether age is a significant risk factor or not, it has been shown that young mothers face more challenges than older mothers, including lower social support and more financial difficulty due to the instability of their partner relationships and limited financial means (Deal & Holt, 1998).

Marital status and relationship with partner. Studies have shown that single status is a major risk factor associated with development of antenatal and postpartum depression (Darcy et al., 2011; Johanson, Chapman, Murray, Johnson, & Cox, 2000). Marital status and relationship with partner are closely linked to social support. Overall low social support during pregnancy and after giving birth, particularly from the baby's father, is associated with high levels of postpartum depressive symptoms (Robertson, Grace, Wallington, & Stewart, 2004).

Having a baby presents a transition period for women and their families. The structure of the family changes and the family has to adjust to this important change. With childbirth, many couples adopt more traditional roles in order to better cope with the transition (Robinson & Stewart, 2001). The partner relationship may suffer as a consequence of the additional burdens faced such as childcare and additional financial needs. Therefore, a supportive partner is especially important for a woman both during and after pregnancy.

Ethnicity. Some studies found that rates of maternal depression between different races were similar (Howell, Mora, Horowitz, & Leventhal, 2005; Ritter et al., 2000; Yonkers et al., 2001). In Saskatchewan, Aboriginal women have a higher birth rate, approximately 2.7% per women in comparison with 1.6% per women provincially (Government of Canada, 2006). Studies (Muhajarine, 1997; Stewart, Gucciardi, & Grace, 2003) also showed that more Aboriginal women suffered from depression compared to non-Aboriginal women. However, Rich-Edwards et al. (2006) found that ethnicity was not an independent predictor for antenatal or postpartum depression, but rather financial hardship among minority women appeared to be the major risk factor for antenatal depression and poor pregnancy outcome was the main predictor for postpartum depression in these women.

2.2.7.5 History of depression and family history of mental illness

A history of mental illness, especially depression at any time, not necessarily maternal depression, was strongly (effect size) or moderately (effect size) associated with postpartum depression (McCoy, et al., 2008; Bloch, Rotenberg, Koren, & Klein, 2006; Beck, 2001; O'Hara & Swain, 1998). Research has indicated that a history of depression was strongly (effect size) related to antenatal depression (Marcus, Flynn, Blow, & Barry, 2003), and having a positive family history of any psychiatric illness is also significantly related to postpartum depression (Steiner, 2002).

2.2.7.6 Self-reported mental health and self-reported general health

Self-reported general health and mental health status are robust measures of well-being and have been used as both predictors of health-related conditions (Idler & Benyamini, 1997) and as independent outcomes of general and mental health (Leung, Luo, So, & Quan, 2007). The measures are typically assessed using a Likert-scale (e.g., excellent, good, fair, or poor) in

response to questions. Self-reported poor general health has been shown to be significantly associated with a variety of self-reported diseases, including depression (Goldberg, Guéguen, Schmaus & Nakache, 2001). In a study conducted by Sawatzky et al. (2001), a strong positive relationship was found between self-reported mental health status and depressive symptoms.

2.2.7.7 Obstetric and infant factors

In this study several obstetric and infant factors were examined as possible risk factors for developing maternal depression. These factors included obstetric factors and pregnancy intention, breastfeeding, and baby's health and baby's temperament.

Obstetric factors and pregnancy intention. Obstetric factors including pregnancy-related complications (e.g. preeclampsia, hyperemesis (excessive vomiting), and premature labor) as well as delivery-related complication (e.g., caesarean section, premature delivery, and excessive bleeding intrapartum) have been examined as potential risk factors for postpartum depression. Results from studies (Johnstone et al., 2001; O'Hara & Swain, 1996) indicate that obstetric complications have a small (effect size) but significant effect on the occurrence of postpartum depression. Other studies have reported findings, which show an association between unplanned or unwanted pregnancies and postpartum depression (Warner, Appleby, Whitton, & Faragher, 1996).

Breastfeeding. Dennis and McQueen (2009) have identified a correlation between depressive symptoms and early termination of breastfeeding. Women who were depressed prenatally were less likely to attempt to breast feed, and those who were depressed postpartum were less likely to continue to breastfeed (Hatton, Harrison-Hohner, Coste, Dorato, Curet, & McCarron, 2005). However, others have reported no difference in the development of depression between women who were breastfeeding and those who were not (Pop et al., 1993).

Baby's health and baby's temperament. Rich-Edwards et al., (2006) found that women who delivered low-birth weight babies were at a threefold increased risk of developing postpartum depression. Other researchers (Mandl et al., 1999) found that women exhibited a higher level of depressive symptoms if their babies due to health problems had more than one visit to a primary care provider. In a meta-analysis of risk factors for developing postpartum depression, Beck (2001) found that infant temperament was moderately (effect size) related to postpartum depression. The instruments used to measure infant temperament were the Infant Characteristics Questionnaire (most commonly used), the Ames Crying Questionnaire, Rothbart's Infant Temperament Questionnaire, and a daily crying record for 7 days.

2.3 Anxiety

Anxiety is a common psychiatric disorder characterized by a feeling of nervousness, a sense of uneasiness, excessive rumination, worrying, or fear of the future (Starcevic, 2010). Anxiety disorders were introduced in 1980 as a distinct classification in the Third Edition of the DSM-III; currently there are twelve anxiety disorder categories listed in the DSM-IV-TR (APA, 1980; APA, 2000).

2.3.1 Prevalence of anxiety

There is limited information about anxiety during pregnancy in Canada. It is known that anxiety disorders affect about 18% of American adults (Kessler, Chiu, Demler, & Walters, 2005), and approximately 12% of Canadian adults (Public Health Agency of Canada, 2002). Studies have shown that anxiety disorders are amongst the most prevalent psychiatric disorders, affecting nearly 35% of women during their lifetime as compared to 22% of men (Kessler, 1994; McLean, Asnaani, Litz, & Hofmann, 2011).

2.3.2 Diagnosis and treatment of anxiety

The criteria in the DSM-IV are generally considered the standard diagnostic approach for anxiety disorders (APA, 2000). To be diagnosed with an anxiety disorder, the criteria described in the DSM-IV have to be met by a careful clinical interview and a mental status examination (APA). A combination of a psychological therapy and pharmacotherapy management is recommended in the treatment of all anxiety disorders (Starcevic, 2010).

Under-diagnosis and under-treatment of anxiety have been major concerns (Jameson & Blank, 2010). A study based on the US 2006 National Ambulatory Medical Care Survey found that only 10-33% of patients were accurately diagnosed with anxiety and of those diagnosed with an anxiety disorder, approximately 33% were never given a treatment recommendation from their care providers (Jameson & Blank, 2010).

2.4 Maternal Anxiety

Anxiety can occur in any stage of one's life. However, women during pregnancy and postpartum are more vulnerable to developing affective disorders including anxiety (Ross & Mclean, 2006). In contrast to depression, maternal anxiety has received little research attention (Ross & Mclean).

2.4.1 Anxiety in pregnancy and postpartum

For women who are pregnant or postpartum, the rates for a generalized anxiety disorder may be higher during pregnancy than in the postpartum period (Heron et al., 2004). In a milder form of anxiety, a woman feels overwhelmed by her responsibilities and unable to cope, while in the more serious form, the woman fears she is losing control and going mad, and experiences incapacitating panic attacks with heart palpitations and difficulties breathing that can make her feel she is suffocating and/or dying (National Institute for Health & Clinical Excellence, 2007).

For some women, anxiety may manifest itself as obsessive-compulsive symptoms, which is more common among women who are depressed (National Institute for Health & Clinical Excellence). Anxiety follows a similar pattern to depression, and most women who are anxious antenatally are also anxious during postpartum (Heron et al., 2004).

2.4.2 Impact of maternal anxiety

Anxiety during the antenatal period poses a significant risk for a child's development. Evidence has shown that antenatal anxiety or stress has been linked with physical defects in children (Hansen, Lou, & Olsen, 2000), low birth weight (Hedegaard, Henriksen, Sabroe, & Secher, 1993), disruption of fetal activity and development (DiPietro et al., 2002), and behaviour/emotional problems (O'Connor et al., 2002).

Postpartum anxiety can severely affect the relationship between a mother and her child and may cause attachment problems (Stein et al., 2012). Other studies have confirmed that postpartum anxiety can lead to feeding difficulties (Ramchandani et al., 2006). For the children of mothers suffering from postpartum anxiety and depression, the possible consequences include poorer personal-social development (Galler et al., 2000), lower adaptability, poorer mood, higher sensory threshold (Galler et al., 2004), and distress with limitation, fear, and negative reactivity (Pesonen et al., 2005).

Antenatal anxiety has been found to be a significant predictor of PPD in three meta-analyses (Beck, 2001; O'Hara & Swain, 1996; Robertson et al., 2004). In one study (Sutter-Dallay et al., 2004), an anxiety disorder diagnosis in pregnancy was associated with a three-fold increase in PPD at 6 weeks. Furthermore, antenatal anxiety, particularly in late pregnancy, has been shown to be predictive of PPD even after controlling for antenatal depression (Heron et al., 2004). Studies have demonstrated that risk of PPD increases with higher levels of self-reported

anxiety in pregnancy (Heron et al., 2004), and with a previous history of anxiety disorder (Johnstone et al., 2001; Matthey et al., 2003).

Although anxiety has been shown to be common among pregnant or postpartum women, sometimes it is confused with depressive emotions or with normal adjustment to the pregnancy because of its comorbidity with depression (Pope, 2000). Some women may experience anxiety symptoms that do not satisfy the specific diagnostic criteria for anxiety, but the DSM IV (American Psychiatric Association, 2000) states that women diagnosed with depression often also have severe anxiety and even panic attacks.

2.5 Comorbidity of Depression and Anxiety

For a long time, anxiety and depression were encompassed by the broad concept of “melancholia”, which was described as “fear or depression that is prolonged” (Foucault, 1965). Some researchers (Himmelhoch et al., 2001) have suggested that anxiety and depression might be best understood as one illness. Although depression and anxiety have been diagnosed distinctively, the two conditions are not mutually exclusive and they often coexist to varying degrees in the same patient. A review of 10 studies of patients with anxiety and 7 studies of patients with depression found that nearly 50% of patients experienced the other condition as well (Wetzler & Katz, 1989). The results from the National Comorbidity Survey in the US of more than 8,000 community-living persons 15 to 54 years of age suggest that comorbid psychiatric disorders, particularly anxiety disorders, tend to predate depressive disorders (Kessler et al., 1996). Findings from studies on pregnant and postpartum women with comorbid depression and anxiety disorder are consistent with findings in the literature on comorbidity in general adult population (Field, et al., 2010; Pollack, 2005; Young, Abelson, & Cameron, 2004).

The comorbidity between depression and anxiety during pregnancy and the postpartum period has made measurement especially challenging (Jomeen & Martin, 2004). The EPDS is a widely used measurement for assessing maternal depression, and it also detects anxiety symptoms (Ross et al., 2003). Similarly, although the State-Trait Anxiety Inventory (STAI) is a popular measure of anxiety, studies showed that the trait scale may also be able to assess depression (Bieling, Antony, & Swinson, 1998).

2.6 Shared Care Model of Health Care

Health care stakeholders have sought the best way to improve health care delivery, and patient care, particularly with mental health services where care provider shortages are frequent. Thus different health delivery models have been developed to meet the demand of health care services. One such model is the “shared care” model, which has shown great promise in improving both service delivery and collaboration among health care professionals.

2.6.1 Definition of shared care

There are many definitions of shared care. In a broad view, Moorehead (1995) described the shared care model:

Shared care is an approach to care which uses the skills and knowledge of a range of health professionals who share joint responsibility in relation to an individual's care.

This also implies monitoring and exchanging patient data and sharing skills and knowledge between disciplines. (p.102)

2.6.2 Shared care models

Various shared care models have been developed; they vary in intensity and duration. Shared care services range from an initial consult model to a program that offers follow-up and maintenance care (Kates et al., 1992; Katon et al., 1995). In mental health shared care models,

the emphasis is on strengthening links between mental health and primary care services in order to improve delivery of care.

In 1996, a Collaborative Working Group on Shared Mental Health Care, a joint initiative of the Canadian Psychiatric Association and the College of Family Physician of Canada produced a document titled “Shared Mental Health Care in Canada: A Compendium of Current Projects” (Kates & Acheman, 1996), a comprehensive overview of shared care initiatives. The compendium describes the components of successful shared care projects: collaborations between health practitioners; improved access to mental health services, paying special attention to underserved areas and specific populations; and the training of health practitioners and continuing education programs. The compendium also stresses program evaluation by providing examples of needs assessments, epidemiological studies, and evaluation of shared care models. The following are two examples of Canadian mental health shared care programs that had been evaluated.

1. **Ottawa Shared Mental Health Care (SHARE), Ottawa, Ontario** (Aubry et al., 2006)

This shared care program, including a psychiatrist, an advanced practice psychiatric nurse, a psychiatric social worker, and a psychologist, offered services to two family practices located in central Ottawa. The entire team spent at least one and a half days per week on this project, providing on-site services for at least one day per week at either of the two family medicine practices and another half day of either on-site or indirect care each week. The mandate of SHARE is to assist family physicians in two practices to treat their patients who present with mental health difficulties. As well, the SHARE services facilitate access to a family physician for Ottawa Hospital patients with moderate and severe mental illness who do not have a family physician. The program also offers

Family Medicine and Psychiatry residents a chance to develop skills relevant to future practice and to see first-hand the benefits of collaboration between primary care and mental health services. The program demonstrated improved access to mental health and primary care services, and improved outcome measures overall – decreased psychiatric symptoms, improved functioning and quality of life.

2. The Hamilton Health Service Organization Mental Health and Nutrition Program, Hamilton, Ontario (Vingilis et al., 2007)

At the end of 2003, the program involved 79 family physicians, 39 mental health counsellors, 17 psychiatrists, and 8 registered dietitians. These practitioners formed integrated, multidisciplinary teams in 36 primary care practices. The program sought to improve communication and collaboration among all practitioners, increase patient access to services, increase continuity of care, and increase the family physicians' comfort and skill in treating their patients with more complex issues. Important and central features of the program are the administrative, educational, and evaluative functions that it performs, which permit selection of primary care providers, provide opportunities for training and collaboration, and facilitate strong physician-patient relationships (Mechanic, 1997).

2.6.3 Benefits and challenges of shared care

The shared care model has been implemented in a variety of health care sectors for over a decade. There are many benefits as well as challenges associated with the models (Chomik, 2005).

Benefits:

- Reduced fragmentation of care: that is, a better integrated, more continuous system of care
- More efficient use of scarce resources and related cost efficiencies
- Strengthened links between primary, secondary and tertiary sectors
- Improved working relationships between providers
- Improved satisfaction among patients and providers
- Increased patient access to care
- Decreased stigma experienced by patients

Challenges:

- Power and status differences between health providers
- Professional territorialism and perceived threat to professional autonomy and/or scope of practice
- Allocation of dedicated time and personnel to implement and manage shared care
- Limited methods to measure shared care

The evaluations of shared care in mental health have shown optimal results in enhancing collaboration, improving access, and delivering patient care (Aubry et al., 2006; Vingilis et al., 2007).

2.7 Chapter Summary

This chapter described major findings related to maternal depression and anxiety, and provided critical information that related to maternal mental health by way of a review of pertinent literature. Despite the increased prevalence of depression and anxiety, and potential negative implications for women, their fetuses and children, and their families, under-diagnosis

and under-treatment of maternal depression and anxiety remain major issues. The temporal relationship between antenatal depression/anxiety and postpartum depression/anxiety has been confirmed. Comorbidity of depression and anxiety is common among pregnant and postpartum women. Risk factors that are significantly related to maternal depression are mainly social determinants of health, history of depression, and obstetric and infant factors. In order to improve health care delivery, a variety of models have been developed, one such model is the “shared care” model which has shown great promise in improving both service delivery and collaboration among health care professionals.

The next chapter presents the manuscript that includes the major components of the study, such as, methods, results, discussion, limitations, and conclusion.

CHAPTER 3: MANUSCRIPT

Evaluation of the Maternal Mental Health Program: A Shared Care Program

Hua Li

School of Public Health, University of Saskatchewan

John Moraros

School of Public Health, University of Saskatchewan

Michael Szafron

School of Public Health, University of Saskatchewan

Nazeem Muhajarine

Department of Community Health and Epidemiology, University of Saskatchewan

Angela Bowen

College of Nursing, University of Saskatchewan

Abstract

Background: The Maternal Mental Health Program (MMHP) was developed to improve the mental health of pregnant and postpartum women in the Saskatoon Health Region. In comparison to other shared care programs in the literature, the MMHP focuses exclusively on maternal mental health.

Methods: Data was collected from MMHP patients and care givers. Descriptive statistics, bivariate associations, and multivariate logistic regression analysis were performed to examine the relationships between EPDS scores and all variables, and between the EPDS anxiety subscale scores and all variables.

Findings: There was a significant reduction of depression and anxiety symptoms. Social determinants of health were associated with these symptoms. The majority of women (75.8%) and physicians (76.5%) were satisfied with the program. These findings suggested that the implementation and maintenance of a shared care maternal mental health program are feasible. It further suggests that in order to improve maternal mental health, the social determinants of health impacting these women have to be addressed.

Key words: maternal health, mental health, depression, anxiety, pregnancy, postpartum

Evaluation of the Maternal Mental Health Program: A Shared Care Program

Mental health problems, particularly depression and anxiety, are increasing worldwide (Ballenger et al., 2001) and are placing a major burden on individuals, families, and society. Women who experience depression during pregnancy or after childbirth are particularly vulnerable. It is estimated that approximately 10-30% of these women experience a level of maternal depression (Bowen et al., 2012; Marcus, Flynn, Blow, & Barry, 2003). Maternal depression affects not only the women, but also her children before and after birth.

According to Barker's hypothesis of "fetal origins of adult disease" (1995), the prenatal environment has a long-lasting impact on an individual's health. Children of mothers who are depressed have more psychopathology and more feeding, sleeping, attachment, developmental, emotional, and behavioural problems when compared to children of mothers who are not depressed (Lieb, et al., 2002; Weissman et al., 2004; Murray & Cooper, 2003; Murray & Cooper, & Hipwell, 2003). In addition, maternal depression is known to cause stress and poor family function, and to result in an increased expense to the health, education, and judicial systems (KidsFirst, 2002; Maki et al., 2003). Therefore, the timely and effective treatment of maternal mental health problems is essential.

Treatment of Maternal Mental Health Problems

Despite the increased prevalence and the potential impact of maternal mental illness on childbearing women, the majority of affected women are either undiagnosed or do not seek help and therefore, do not receive appropriate treatment (Pearlstein, Howard, Salisbury, & Zlotnick, 2009). Studies have shown that family physicians fail to identify postpartum depression, and when pregnant and postpartum women are diagnosed with depression, family physicians are

more cautious and tend to either not treat or under-treat the illness (Cohen, 2005; Cooper & Murray, 1998). In an attempt to address these issues, different health delivery models have been developed to improve mental health. One such model is the “shared care” model.

Shared Care Model

Shared care is defined as the collaboration between primary care physicians and specialty care physicians to provide care that includes consultation and brief treatment within family practice, community, and primary care settings (Kates, Craven, Crustolo, Nikolaou, & Allen, 1997). The collaboration of psychiatrists, family physicians, and other health care team members provides opportunities to build capacity for more effective mental health care (Kates, Crustolo, Farrar, & Nikolaou, 2002; Rockman et al., 2004). The shared-care model has been implemented in various clinical settings, including mental health, to enhance the delivery of services and has been shown to promote continuity of care and better management of patients (Kates et al., 2002; Thielke, Vannoy, & Unützer, 2009). Evaluations of shared-care models have consistently demonstrated decreased stigma, increased client and caregiver satisfaction, and decreased use of traditional mental health services (Kates et al.). The MMHP is a local program that uses a shared care approach to improve maternal mental health within the Saskatoon Health Region (SHR).

The Maternal Mental Health Program

Over 3,500 women give birth each year in the SHR. According to studies (Bowen et al., 2012; Bowen, Stewart, Baetz, & Muhajarine, 2009; Marcus, Flynn, Blow, & Barry, 2003), approximately 10-15% of these women experience maternal depression in Canada. Based on this estimate, approximately 350-525 women each year living in the SHR potentially experience depression and need help (Bowen, Baetz, McKee, & Klebaum, 2008). However, according to

the local Postpartum Depression Support Group, each year only about 100 women seek and receive help (Avis & Bowen, 2004), which indicated that the number of women seeking help within the SHR is significantly lower than expected (approximately 2.86%).

The Maternal Mental Health Program (MMHP) was developed to improve the mental health of pregnant and postpartum women in the SHR. The MMHP is co-located at a Primary Health Centre and within the Department of Psychiatry, University of Saskatchewan, Saskatoon, Canada. Women, who attend the MMHP, receive consultation from a psychiatrist specializing in anxiety and mood disorders, a clinical health psychologist, and a nurse therapist specializing in counseling individuals with depression. The MMHP also provides access to a postpartum depression group, a weekly facilitated educational and peer support group.

Additionally, the MMHP provides consultation and support for local practitioners. Education has been ongoing at professional conferences, grand rounds, and “lunch-and-learn” sessions at family practice offices, and with presentations at grand rounds in psychiatry and obstetrics (Bowen et al., 2008).

Quantitative Evaluation of the Maternal Mental Health Program

The MMHP was initiated in September 2006. After five years of operation, a quantitative evaluation was conducted in 2011 as a component of this study. The quantitative evaluation was based on three research questions:

1. Have the products and programs of the MMHP helped to reduce the symptoms of depression and anxiety in pregnant and postpartum women?
2. What are the risk factors associated with maternal depression and anxiety in the present population?

3. Have the products and programs of the MMHP met the expectations of the women attending the program, and the referring physicians and other health care practitioners?

Methods

Study Design

All women who attended the MMHP between September 2006 and August 2011 and who had completed the intake questionnaire were invited to participate in the evaluation. A pre and post cross-sectional study was used to evaluate the women's anxiety and depression symptoms. Women and physician satisfaction with the MMHP were evaluated in a one-time cross-sectional study.

Ethics Approval

Ethics approval was obtained from the Research Ethics Office and the SHR. All participants signed an informed consent and their participation was voluntary. Refusal to participate in the evaluation did not change the care and services provided to them by the program.

Study Sample and Procedure

The study sample included women who participated in the MMHP, and physicians and other health care practitioners who referred their patients to the MMHP.

Women. The possible participants were pregnant and postpartum women who had attended the program. The women came to the MMHP via two main sources: self-referral through the postpartum depression hotline, or by their physician or other health practitioners. Women in the MMHP were mailed arrangements for their initial appointment along with the intake questionnaire. Then they either brought the completed intake questionnaire to the MMHP when they attended their first appointment or completed it while waiting to be seen by a health

care provider. Upon discharge from the MMHP, a post evaluation questionnaire and a self-addressed stamped envelope was mailed to the women who had completed the intake questionnaire and who had agreed to participate in the evaluation. Women who did not return the evaluations were contacted by phone and additional copies were mailed to them.

Physicians and other practitioners. Throughout the year 2011, the Physician's Survey Questionnaires were distributed at the Department of Obstetrics and Gynecology monthly meetings, at the Department of Family Medicine Monthly administrative meetings, and at Obstetrics and Gynecology Grand Rounds; and only physicians who provided care to prenatal and postpartum women were asked to complete the questionnaires during these activities. A letter, along with the questionnaire, was sent to the physicians from the MMHP referral list who had not yet completed the questionnaire.

Measurement

In this study, measurement tools were used to assess depression, anxiety, social support, and satisfaction with the MMHP from women who attended the MMHP and from physicians who referred their patients to the MMHP.

Depression: Depression symptoms were measured at intake and at evaluation using the Edinburgh Postnatal Depression Scale (EPDS). The EPDS was developed as a screening tool to help primary health care workers identify mothers who were experiencing postnatal depression (Cox, Holder, & Sagovsky, 1987). The EPDS is the most widely used self-report measure for screening postnatal depression (Matthey, Henshaw, Elliot, & Barnett, 2006). The EPDS requires respondents to select one of four possible responses (0-3) to each of ten questions to indicate how they felt in the previous week. The maximum score is 30 (range 0-30, 0 = not depressed, 30 = highest score of depressive mood). Validation studies of the EPDS have been conducted in

different cultures, languages, and settings, including Saskatchewan (Clarke, 2004; Cox & Holden, 2003). The EPDS has been found to have a sensitivity of 79% and specificity of 85% (Cox, Chapman, Murray, & Jones, 1996). A cut-off score of 13 (≥ 13 indicates depressed, < 13 indicates less depressed) has been validated in many studies of perinatal depression (Limlomwongse & Liabsuetrakul, 2006; Matthey et al., 2006; Pope, 2000; Thessedre & Chabrol, 2004), and is used in this study to determine woman's depression status.

Anxiety: Anxiety symptoms were measured at intake and post evaluation using the EPDS Anxiety Subscale. The three-item EPDS Anxiety Subscale (items 3, 4, and 5) can detect both antenatal and postpartum anxiety (Bowen, Bowen, Maslany, & Muhajarine, 2008; Ross, Gilbert Evans, Sellers, & Romach, 2003; Tuohy & McVey, 2008). In clinical settings, a cut-off score of 4 (≥ 4 indicates anxious, < 4 indicates less anxious) was suggested for determining anxiety among mothers with unsettled baby (Phillips, Charles, Sharpe, & Matthey, 2009). However, a cut-off score of 6 (≥ 6 indicates anxious, < 6 indicates less anxious) has been previously used to detect anxiety in community samples (Matthey, 2008). In this study, the participants were a community sample; therefore, a score of 6 or higher indicated anxiety, and was used as a continuous variable.

Social support: Social support was measured at intake with the Maternity Social Support Scale (MSSS). The MSSS measures perceived support from the woman's family, friends, and partner (Webster et al., 2000). Social factors associated with postpartum depression are combined in a six-item self-reported five-point Likert-like scale (5: always, 4: most of the time, 3: some of the time, 2: rarely, 1: never) (Webster et al.). The total possible score for the scale is 30, with higher scores indicating greater perceived support, and incomplete questions on partnership being scored as zero (Wahn & Nissen, 2008). Social support was categorized into

three levels: low support (0-18), medium support (19-24), and adequate support (25-30) (Wahn & Nissen).

Satisfaction with the MMHP: The Women's Evaluation Questionnaire was designed to measure participating women's satisfaction with the MMHP. The questionnaire was comprised of an eight item, five-point, Likert style scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree). Cronbach's α was computed to test reliability of the items on the questionnaire.

The Physician's Survey Questionnaire was developed to assess physician's expectations of and satisfaction with the MMHP. The questionnaire included a ten-item, five-point, Likert-style scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree) and questions about the physician's gender, years of practice, and medical specialty. Cronbach's α was computed to test reliability of the physician's evaluation questionnaire.

Data Analysis

Descriptive statistics were performed. The Wilcoxon Signed Rank test was used to evaluate the difference in mean EPDS and anxiety subscale score at intake and post evaluation. Bivariate associations between the dependent variables (EPDS and the EPDS anxiety subscale) and all independent variables (socio-demographic, medical information, modifiable factors, obstetric, and breastfeeding status) were examined using a chi square test for association both at the time of intake and at the time of evaluation. Independent variables with a significant association ($p \leq 0.25$) were included in a multivariate model of binary logistic regression analysis, using the STEPWISE procedure (Saumuels, Witmer, & Schaffner, 2012). Results are presented as odds ratio (Exp (β)) with 95% confidence intervals (CI) and the associated p – value. Descriptive statistical methods of frequency, percentage, mean (M), and standard

deviation (SD) were calculated for the women's and the physician's evaluation. Comparisons of the women's socio-demographic variables, physicians' gender, years of practice, and medical specialty were tested using either the Mann-Whitney U test, or Kruskal – Wallis ANOVA. Post-hoc comparisons for the Kruskal – Wallis ANOVA were performed via the Mann – Whitney U test with Bonferroni's correction. Cronbach's α was computed to determine the reliability of the EPDS score, the EPDS anxiety subscale score, and the women's and physicians' evaluation questionnaires. Significance was set at $p < 0.05$.

Factor analyses were conducted on the eight-item women's evaluation questionnaire and on the ten-item physician evaluation questionnaires with the use of principle component extraction method. Three criteria were used to determine the number of the factors to rotate: the hypotheses that the measure was unidimensional, the Scree test, and the interpretability of the factor solution (Green & Salkind, 2011).

The data were analyzed using the SPSS for Windows 19.0 (2010) software package. A 95% confidence interval was used unless otherwise specified. The SPSS Missing Value 19.0 software was used for imputation of missing values in all variables.

Results

This section presents the findings of characteristics of women and physicians, reduction of depression and anxiety symptoms, risk factors associated with anxiety and depression symptoms, evaluation of women's satisfaction with and expectation of the MMHP, and evaluation of physician satisfaction with and expectation of the MMHP.

Characteristics of the women in the sample

A total of 227 women completed the intake questionnaire. Of those, 183 women (80.6%) gave written consent to participate in the study. Of those 183 women, 99 (54.1%) completed

both the intake and post evaluation questionnaires. Table 1 provides a summary of the socio-demographic characteristics of the participating women.

Characteristics of physician participants

Out of a possible 136 participants (126 who had referred patients to the MMHP and an additional ten physicians who completed the questionnaire during meetings), a total of 98 questionnaires were returned, for a response rate of 72.1%. Table 2 provides a summary of the gender, years of practice, and specialty of the physicians.

Reduction of depression and anxiety symptoms

Table 3 presents the changes for all participating women in the EPDS and the EPDS anxiety subscale mean scores from the time of intake to the time of evaluation, changes for women with EPDS mean score ≥ 13 and women with EPDS score < 13 from the time of intake to the time of evaluation. It also shows the changes for women with the EPDS anxiety subscale score ≥ 6 and women with EPDS anxiety subscale score < 6 from the time of intake to the time of evaluation.

As illustrated in Table 3, for all of the participating women, the intake EPDS mean score was 14.97 (*SD*: 5.97) and the evaluation EPDS mean score was 9.13 (*SD*: 5.71). The mean EPDS score at evaluation was significantly lower than the mean EPDS score at intake ($p < 0.001$). The intake EPDS anxiety subscale mean score was 5.90 (*SD*: 2.04) and the evaluation EPDS anxiety subscale mean score was 3.86 (*SD*: 2.36). The mean EPDS anxiety subscale score at evaluation was significantly lower than the mean EPDS anxiety subscale score at intake ($p < 0.001$).

Table 1. Socio-demographic information of women

Variables	Frequency	%
Age (years)		
≤ 20	6	6.1
21 – 30	52	52.5
>30	41	41.4
Education level		
< grade 12	6	6.8
= grade 12	12	13.6
Some post - secondary	25	28.4
Post - secondary	48	54.5
Missing	8	8.1
Employment status		
Yes	54	62.8
No	32	37.2
Missing	13	13.1
Family income		
< \$ 20,000	12	14.5
≥\$20,000 to < \$40,000	14	16.9
≥\$40,000 to < \$60,000	16	19.3
≥\$60,000	32	38.6
Rather not say	9	10.9
Missing	16	16.2
Financial concerns		
Yes	43	55.8
No	34	44.2
Missing	22	22.2
Marital status (n = 88)		
With partner	74	84.1
Without partner	14	15.9
Missing	11	11.1
Ethnicity (n = 86)		
Caucasian	74	86.0
Aboriginal	12	14.0
Missing	13	13.1

Table 2. Physician gender, years of practice, and medical specialty

Variables	Frequency	%
Gender		
Female	54	55.1
Male	36	36.7
Not identified	8	8.2
Years of practice		
0-10	31	31.6
11-20	20	20.4
21-30	22	22.5
>30	21	22.4
Not identified	4	4.1
Specialty		
Family physician	78	79.6
Obstetrician/gynecologist	16	16.3
Psychiatrist	2	2.0
Family medicine resident	1	1.0
Midwife	1	1.0

According to Table 3, for women who were depressed (i.e., EPDS score ≥ 13), the intake EPDS mean score was 18.55 (SD: 3.79) and the evaluation EPDS mean score was 10.51 (SD: 5.98), which represents a 44.3% reduction in EPDS score. The mean EPDS score at evaluation was significantly lower than the mean EPDS score at intake ($p < 0.001$). Women with an EPDS score < 13 had an intake EPDS mean score of 8.61 (SD: 3.14) and an evaluation EPDS mean score of 6.68 (SD: 4.27), which represents a reduction of 23.7% in the EPDS score. The mean EPDS score at evaluation was significantly lower than the mean EPDS score at intake ($p = 0.014$).

Table 3. Changes in EPDS/EPDS Anxiety Subscale mean scores from intake to evaluation

Dependent variables	Frequency	Mean (SD) at intake	Mean (SD) at evaluation	Total possible score	P-value
All participating women					
EPDS score	99	14.97 (5.97)	9.13 (5.71)	30	<0.001
EPDS anxiety subscale score	99	5.90 (2.04)	3.86 (2.36)	9	<0.001
Women with EPDS score ≥ 13 and EPDS score <13					
EPDS score ≥ 13	61	18.55 (3.79)	10.51 (5.98)	30	<0.001
EPDS score <13	38	8.61 (3.14)	6.68 (4.27)	30	0.014
Women with EPDS anxiety subscale score ≥ 6 and EPDS anxiety subscale score <6					
EPDS anxiety subscale score ≥ 6	67	7.05 (1.01)	4.76 (2.16)	9	<0.001
EPDS anxiety subscale score <6	32	3.54 (1.50)	3.21 (2.08)	9	0.349

As illustrated in Table 3, for women who were anxious (i.e., EPDS anxiety subscale score ≥ 6), the intake EPDS anxiety subscale mean score was 7.05 (SD: 1.017) and the evaluation EPDS anxiety subscale mean score was 4.76 (SD: 2.16), which indicated a 32.4% reduction ($p < 0.001$) in EPDS anxiety subscale score. Women with an EPDS anxiety subscale score < 6 had an intake EPDS anxiety subscale mean score of 3.54 (SD: 1.50) and an evaluation EPDS anxiety subscale mean score of 3.21 (SD: 2.08), a reduction of 9.09% in EPDS anxiety subscale score. There was no significant difference found.

The Cronbach's α for the EPDS at intake and at the evaluation were calculated. At intake the Cronbach's α was 0.87 with a slightly higher reliability coefficient at evaluation ($\alpha = 0.89$).

Risk factors associated with anxiety and depression symptoms

Bivariate associations between dependent variables (EPDS and the EPDS anxiety subscale) and all independent variables were examined at both intake and evaluation using the chi square test for association. The independent variables included the categories: socio-demographic (age, education level, income/financial concerns, employment status, marital status, and ethnicity), medical (diagnosis, history of depression, history of antenatal depression, history of PPD, family history of mental illness, psychotropic medication taken, self-reported mental health, and self-reported general health), obstetric (pregnancy intention, and obstetrical complications), breastfeeding and baby's status information (breastfeeding status, baby's health, and baby's temperament) as well as information on modifiable factors (social support, relationship with partner, services utilization within the MMHP, and services utilization outside of the MMHP). Independent variables with a p -value ≤ 0.25 in chi square test for association (refer to Table 4 and 5) were included in the logistic regression analysis. Table 6 shows the results of the logistic regression, and Table 7 presents the significant ($p < 0.05$) associations between depressive symptoms and risk factors, and the significant association between anxiety symptoms and risk factors.

As illustrated in Table 7, independent variables that were significantly associated with depression were financial concerns ($p = 0.002$), unemployment status ($p = 0.017$), and lack of social support ($p = 0.005$). Financial concerns ($p = 0.013$), and poor self-reported mental health ($p = 0.003$) were significantly associated with anxiety.

Table 4. Chi square association test results: depression and independent variables

Variables	<i>p-value</i> at intake	<i>p-value</i> at evaluation
Age	0.479	0.977
Education Level	0.254	0.241
Employment Status	0.071	0.538
Family Income	0.373	0.724
Financial Concerns	<0.001	0.160
Marital Status	0.074	0.576
Ethnicity	0.267	0.707
One diagnosis	0.490	0.884
Two diagnosis	0.282	1.000
History of depression	0.353	0.049
History of antenatal depression	0.750	0.070
History of PPD	0.614	0.293
Family history of mental illness	0.523	0.420
Psychotropic medications at intake	0.599	0.889
Psychotropic medications at evaluation	0.400	1.000
Self-reported mental health	<0.001	0.955
Self-reported general health	0.025	0.389
Relationship with partner	0.242	0.129
MSSS	0.028	0.156
Services –Outside of MMHP	0.060	0.999
Services – within MMHP	0.002	0.321
Group attended	0.385	0.416
BF – intake for PP women	0.037	0.114
BF – evaluation for PP women	0.102	0.283
Baby's Health	N/A at intake	0.920
Baby's Temperament	N/A at intake	0.734
Pregnancy intention	0.388	0.559
Delivery type	0.337	0.266
Delivery Complication	0.483	0.453
Pregnancy Complication at intake	0.623	0.033
Pregnancy Complication at evaluation	0.385	0.693

Table 5. Chi square association test results: anxiety and independent variables

Variables	<i>p-value</i> at intake	<i>p-value</i> at evaluation
Age	0.953	0.550
Education Level	0.510	0.638
Employment Status	0.615	0.615
Family Income	0.510	0.638
Financial Concerns	0.001	0.780
Marital Status	0.312	0.889
Ethnicity	0.415	0.483
One diagnosis	0.543	0.895
Two diagnosis	0.461	0.663
History of depression	0.726	0.116
History of antenatal depression	0.405	0.113
History of PPD	0.651	0.462
Family history of mental illness	0.964	0.809
Psychotropic medications at intake	0.050	0.789
Psychotropic medications at evaluation	0.351	0.019
Self-reported mental health	0.493	0.130
Self-reported general health	0.677	0.792
Relationship with partner	0.602	0.234
MSSS	0.439	0.259
Services –Outside of MMHP	0.506	0.705
Services – within MMHP	0.083	0.474
Group attended	0.499	0.087
BF – intake for PP women	0.102	0.119
BF – evaluation for PP women	0.414	0.949
Baby's Health	N/A at intake	0.650
Baby's Temperament	N/A at intake	0.848
Pregnancy intention	0.645	0.368
Delivery type	0.145	0.748
Delivery Complication	0.832	0.902
Pregnancy Complication at intake	0.771	0.566
Pregnancy Complication at evaluation	0.608	0.924

Table 6. Logistic regression results

Variables	<i>p-value</i> at intake	<i>p-value</i> at evaluation
Depression and independent variables		
Education Level	*	0.069
Employment Status	0.017	*
Financial Concerns	0.002	0.384
Marital Status	0.114	*
History of depression	*	0.055
History of antenatal depression	*	0.822
Self-reported mental health	0.083	*
Self-reported general health	0.614	*
Relationship with partner	0.082	0.167
MSSS	0.005	0.076
Services –Outside of MMHP	0.425	*
Services – within MMHP	0.222	*
BF – intake for PP women	0.247	0.389
BF – evaluation for PP women	0.395	*
Pregnancy Complication at intake	*	0.126
Anxiety and independent variables		
Financial Concerns	0.013	*
History of depression	*	0.371
History of antenatal depression	*	0.139
Psychotropic medications at intake	0.949	*
Psychotropic medications at evaluation	*	0.789
Self-reported mental health	*	0.003
Relationship with partner	*	0.538
Services – within MMHP	0.215	*
Group attended	*	0.354
BF – intake for PP women	0.234	0.508
Delivery type	0.462	*

* Independent variables with a p-value > 0.25 in chi square test for association were not included in the logistic regression analysis

Table 7. Logistic regression: significant variables associated with depression and anxiety

Variables	Exp (β) (95% CI)	<i>p</i>-value
Significant variables associated with depression		
Financial concerns (Yes)	9.091 (2.232-37.037)	0.002
Employment status (Unemployed)	4.695 (1.320-16.689)	0.017
MSSS (Low support)*	3.667 (1.487-9.043)	0.005
Significant variables associated with anxiety		
Financial concerns (Yes)	4.000 (1.339-11.904)	0.013
Self-reported mental health		
• Excellent/very good	Referent	
• Poor	5.000 (1.709-14.628)	0.003

Evaluation of women's satisfaction with and expectation of the MMHP

The women's satisfaction with and expectation of the MMHP are presented based on the eight-item MMHP questionnaire. The evaluation questionnaire was an 8-item, 5-point, Likert-style questionnaire, and included a point of "neutral". Since "neutral" can be interpreted as "not sure", it is not included in the discussion sections. A Cronbach's α of 0.86 was obtained for the women's questionnaire indicating high internal consistency.

A factor analysis was conducted with the use of the principle component extraction method. To obtain the factors, a Promax rotation was used. The resulting of scree plot revealed that the initial of unidimensionality was incorrect. Using the criterion of "eigenvalue-greater-than-1", there were two underlying factors. The two factors were shown to be very weakly correlated. Hence, the two-factor solution was determined using a Varimax rotation to yield interpretable factors (Green & Salkind, 2011). One of the factors measures the quality and acceptability of care received from MMHP staff, while the other factor assessed the MMHP overall.

The care received from staff within the MMHP. Overall, 76% of the women (i.e. 73) thought that the staff adequately explained their care to them as opposed to the 8.3% (i.e. 8) who did not feel that the staff adequately explained their care. Over 87% of women (i.e. 85) believed that the person who cared for them at the MMHP was thorough and competent while 5.2% of women (i.e. 5) disagreed.

The MMHP overall. Over 88% of women (i.e., 87) would recommend the MMHP to other women like them, and only 4.1% of women (i.e., 4) would not recommend the program. Nearly 76% of women (i.e., 75) believed that the MMHP met their expectations, while 9.1% of women (i.e., 9) disagreed. When the women were asked whether or not the staff understood their mental health problem(s), nearly 84% of women (i.e., 83) agreed and only 6.1% of women (i.e., 6) did not agree with this statement. Women's satisfaction with and expectations of the MMHP are summarized in Figure 1.

Differences in the women's satisfaction with and expectations of the MMHP according to socio-demographic information

Women over 30 years of age ($M = 3.93$, $SD = 1.172$) were more likely than women less than 20 years of age ($M = 2.50$, $SD = 0.971$) to report that "The problem that was brought to the MMHP improved as much as I hoped it would be" (item 8; $p = 0.023$). Women with greater financial concerns ($M = 4.32$, $SD = 0.971$) were more likely to respond more favorably to the fifth item on the question, which stated "The staff explained my care to me" than women who had no financial concerns ($M = 3.82$, $SD = 1.117$) ($p = 0.027$). There were no significant differences found in other variables.

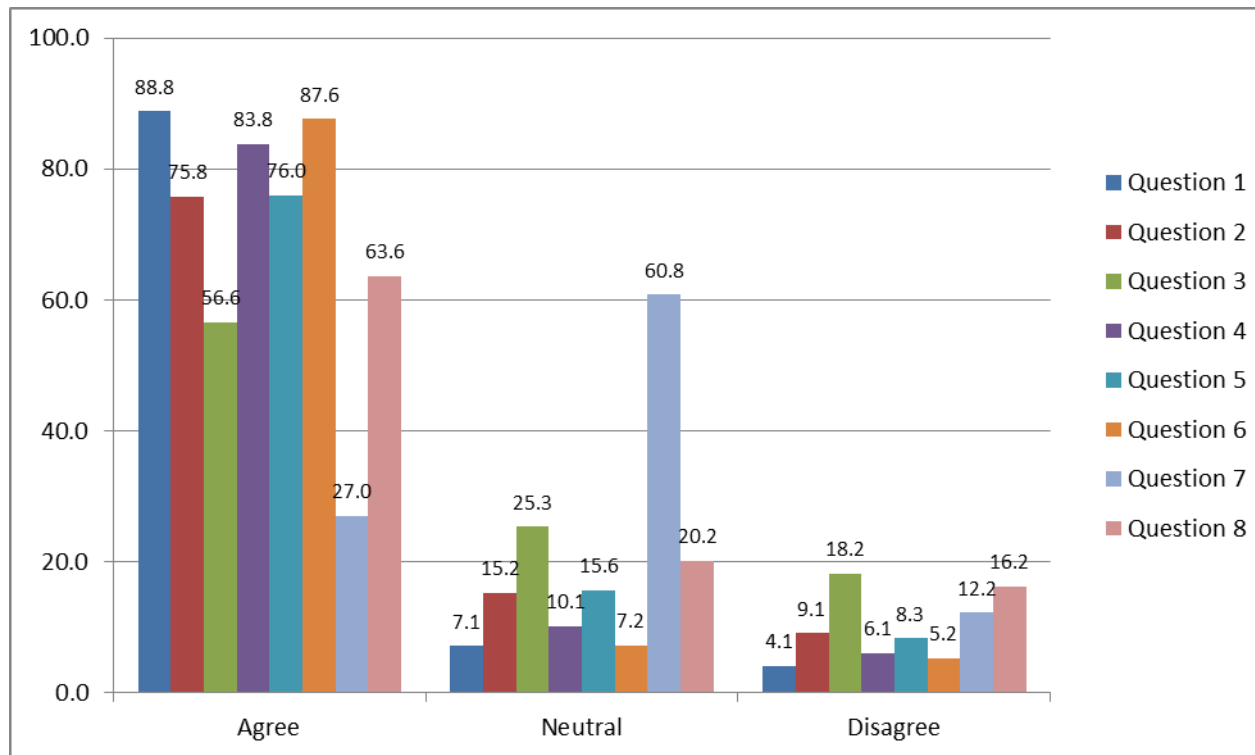


Figure 1. Women's satisfaction with and expectations of the MMHP

Items of the Questionnaire:

1. I would recommend the MMHP to other women like me
2. The MMHP met my expectations
3. The location of the MMHP is convenient
4. The staff understood my problems
5. The staff explained my care to me
6. The person who cared for me at the MMHP was thorough and competent
7. The child care services met my needs
8. The problem that was brought to the MMHP improved as much as I hoped it would be

Evaluation of physician satisfaction with and expectation of the MMHP

The physician's satisfaction with and expectation of the MMHP are presented based on the ten-item MMHP questionnaire. Cronbach's α was obtained for the physician's questionnaire ($\alpha = 0.91$).

The evaluation questionnaire is a 10-item, 5-point, Likert-style questionnaire, and includes a point of “neutral”. Since “neutral” can be interpreted as “not sure”, it is not included in the discussion sections.

A factor analysis was conducted with the use of the principle component extraction method. To obtain the factors, a Promax rotation was used. The resulting of scree plot revealed that the initial hypothesis of unidimensionality was incorrect. Although the criterion of “eigenvalue-greater-than-1” suggested that there were three factors underlying factors, the scree plot indicated that there were two underlying factors. The two factors were shown to be moderately correlated. The two-factor solution was determined using a Promax rotation with two factors to yield the interpretable factors (Green & Salkind, 2011). One of the factors measures the comfort and competence with treating maternal mental health patients, while the other factor assesses the effectiveness of the MMHP overall.

Physician comfort and competence with treating maternal mental health patients.

Nearly 62% physicians (i.e. 58) felt more confident now treating women with maternal mental health issues, and 9.6% of physicians (i.e. 9) disagreed.

The MMHP overall. Approximately 61% of the physicians (i.e. 56) believed that the waiting time for their patients to receive care from the MMHP was reasonable, and 7.6% (i.e. 7) did not agree. Over 54% of the physicians (i.e. 51) believed that the MMHP had improved their knowledge of maternal mental health, and nearly 16% (i.e. 15) did not agree. Over 70% of the physicians (i.e. 65) thought that the consultation received from the MMHP provided enough information to allow them to care their patients, and only 1.1% (i.e. 1) did not agree. Over 87% of the 82 physicians who responded to the question were happy to refer their patients to the MMHP, and 2.1% (i.e. 2) were not. Nearly 94% of the 75 physicians who answered the question

rated the MMHP as excellent, very good or good. Over 95% of the 61 physicians who responded to this question believed that the MMHP met their expectations.

Physician satisfaction with and expectations of the MMHP based on the ten-item questionnaire is summarized in Figure 2.

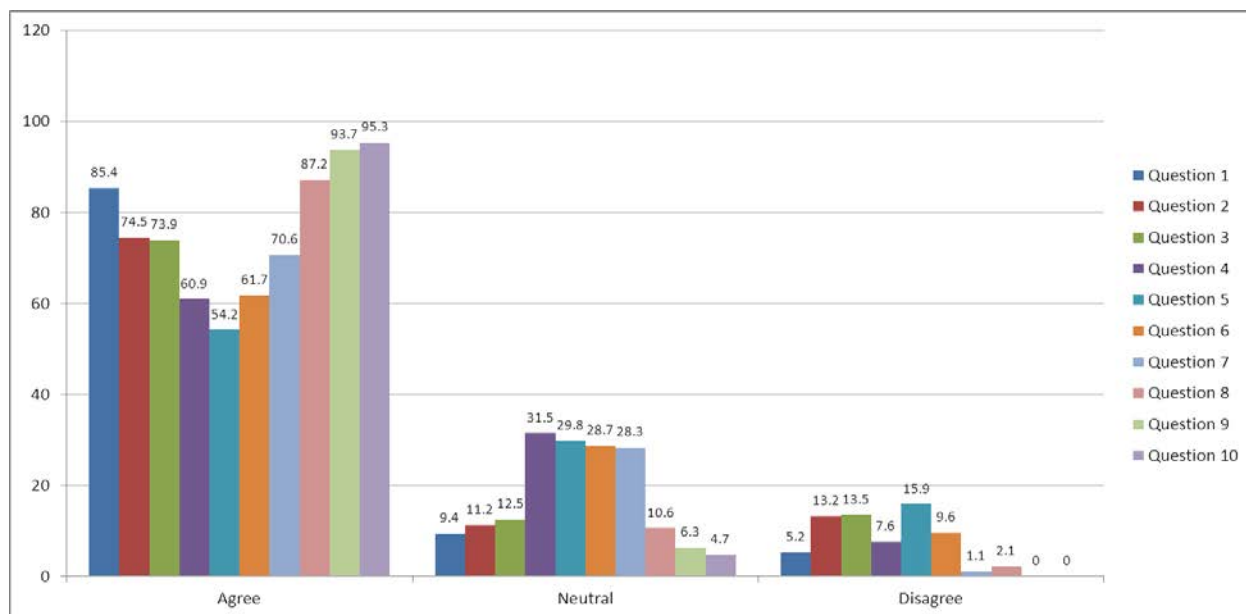


Figure 2. Physicians' satisfaction with and expectations of the MMHP

Items of the questionnaire:

1. I am familiar with the MMHP.
2. I know how to refer my patients to the MMHP.
3. I am aware that there is a psychologist, nurse therapist as well as a psychiatrist who I can make referrals to at the MMHP.
4. The waiting time for my patient to receive care from the MMHP is reasonable.
5. The MMHP has improved my knowledge of maternal mental health.
6. I feel more confident now treating women with maternal mental health issues.
7. The consultation received from MMHP provides enough information to allow me to care my patients.
8. I am happy to refer my patients to the MMHP.
9. Rate the MMHP overall.
10. How well has the MMHP met these expectations?

Evaluation of possible bias between participating physicians

In this study, 98 physicians responded to the questionnaire. Ten of those physicians had not referred patients to the MMHP. In order to understand whether or not the responses of those

ten physicians would bias the result, their responses were compared to those physicians who had referred patients. There was no significant difference found between them.

Physicians' satisfaction with and expectation of the MMHP according to gender, years of practice, and specialty

Female physicians were more likely than the male physicians to report that “The waiting time for my patient to receive care from the MMHP is reasonable” (item 4; $M=3.84$, $SD=0.862$, $p = 0.021$). Female physicians were also more likely than male physicians to rate the MMHP favorably (item 9; $M=4.06$, $SD=0.727$, $p = 0.003$). There were no significant differences found in other comparisons.

Discussion

Reduction of anxiety and depression symptoms

The findings indicate that there was significant reduction of anxiety and depression symptoms for all participating women, particularly for those who were depression (EPDS score ≥ 13) and who experienced anxiety symptoms (EPDS anxiety subscale score ≥ 6) at the time of intake tended to have significantly lower levels of depression and anxiety after receiving treatment from the MMHP.

In the current study, women were at different stages of gestation and weeks postpartum; therefore, the reduction of anxiety and depression symptoms occurred at different times. Although some researchers have suggested that for large percentage of women who are depression, depression levels are highest during the first few months postpartum and decrease significantly soon after (Heron, et al., 2004; Campbell & Cohn, 1997), others studies have shown no significant change in depressive levels after the early postpartum period (Beeghly et al, 2002;

Horowitz & Goodman, 2004). Additionally, there are a significant number of women whose postpartum depression continues well beyond the early postpartum period (Goodman, 2004).

Risk factors associated with maternal depression and anxiety

Researchers have examined the factors associated with antenatal and postpartum depression among mothers and have found that young age (Mayberry, Horowitz, & Declercq, 2007; Rich-Edwards et al., 2006), low income (Leigh & Milgrom, 2008; Rubertsson, Wickberg, Gustavsson, & Radestad, 2005), lower educational attainment (Mayberry, Horowitz, & Declercq, 2007; Marcus et al., 2003), history of depression (Le, Munoz, Soto, Delucchi, & Ippen, 2004; McCoy, et al., 2008; Bloch, Rotenberg, Koren, & Klein, 2006; Robertson, et al., 2004), and low social support (Cheng & Pickler, 2009; Robertson, et al., 2004; Field et al., 2002) all play a critically important role. A meta-synthesis study by Robertson, Grace, Wallington, and Steward (2004) found that strong (effect size) to moderate (effect size) risk factors that were associated with postpartum depression were antenatal depression or anxiety, past history of psychiatric illness, life events, social support, and marital relationship; however, socioeconomic status was found to only be a small (effect size) risk factor.

This study has confirmed some of the risk factors associated with antenatal/postpartum depression including the social determinants of health, such as financial concern, unemployment, and low social support. In the study population, some women who attended the program, not only experienced maternal depression or/and anxiety, but also had complex social issues, such as lower socio-economic status, and poor social support that were not likely to be remedied by the program. Therefore, women who attend the MMHP may be in need of more social support and assistance during their treatment.

Women's evaluation of the MMHP

We were not able to find any literature describing shared care models that focus on maternal mental health for comparison to our study findings. Most of the participating women recommended the MMHP to other women who experienced maternal depression or/and anxiety and believed that the MMHP satisfied their needs in two areas: 1) Understanding and provision of care from the MMHP staff and 2) Attitude and competency of the MMHP staff. The evaluation suggested that the staff in the MMHP was supportive and understanding of the women's problems and the staff provided competent care to the participating women. The MMHP met the objectives in not only providing mental health services to participating women, but also by strengthening their social networks through the use of referrals to appropriate support groups.

For item 8 "The problem that was brought to the MMHP is improved as much as I hoped it would be", women less than 20 years of age rated the item 2.5 out of 5.0. This result may be related not only to the mental health issues that brought the women to the program, but also to other stressors in their lives such as lack of social support and financial difficulties (Cheng & Pickler, 2009; Robertson et al., 2004; Goyal, Murphy, Cohen, 2006), which most likely did not improve during the course of treatment. As these women were more likely to have additional social stressors, addressing larger social issues that potentially impact depression should be considered.

Physician evaluation of the MMHP

The evaluation suggested that the majority of physicians agreed that the MMHP met their expectations of accessibility. The median waiting time for seeing a psychiatrist on an elective basis for the MMHP was 4 weeks compared to 5.5 weeks for Saskatchewan overall, and 7 weeks

nationally (Esmail, 2011). The Canadian Psychiatric Association recommends that the waiting time to access to a psychiatrist after a family physician referral should be no more than 4 weeks (Canadian Psychiatric Association, 2006). Some physicians within the SHR wanted their patients to have more immediate access to the MMHP, which may indicate that some cases were urgent and needed quicker access or perhaps there was a greater expectation for a specialized shared care service.

Similar to other evaluations of shared care programs (Aubry et al., 2006; Hobbs, Wilson, & Archie, 2004), the majority of physicians reported that they felt more comfortable and confident treating their patients since referring them to the MMHP. However, some physicians did want more structured educational sessions in order to improve their knowledge. This physician request can be addressed by providing more resources and offering a more effective communication mechanism between interdisciplinary team members.

Limitations

As this is a cross-sectional study without a control group, the results can be used to make inferences about possible relationships or to gather preliminary data to support further research; however, the findings cannot be used to determine cause-and-effect relationships (Friis & Sellers, 2009).

Of the 183 women who signed the consent, only 54.1% (99 women) returned the evaluation questionnaires despite simplifying the method of getting consent. The low response rate may be due to the negative mental status of the participating women, or the newfound demands placed on their lives by having to take care of their newborn. There were also a number of changes in the secretarial support offered from the Department of Psychiatry at the onset of the program, which possibly affected administration of the intake and evaluation packages.

All of the socio-demographic data were collected at the time of intake. However, some of the information might have changed during the period a woman participated in the MMHP. Nonetheless, the socio-demographic data were useful to test the associations between the variables and depression, and the relationship between the variables and anxiety subscales at the time of evaluation.

Conclusions

The evaluation component of the present study demonstrated that the shared care model can yield favourable results in the delivery of care for women with maternal mental health problems. The MMHP is a good example of implementation and maintenance of a shared care program within a local setting. The findings of the study suggest that establishing a waiting time target, providing structured training for physicians, and continuing efforts to collaborate between the MMHP and local physicians are essential in effectively addressing maternal mental health issues. The present study also revealed that the risk factors associated with maternal depression and anxiety are closely interlinked with various social determinants of health, including financial concerns, unemployment status, and low social support. These risk factors must be accurately identified and effectively addressed in order to improve overall maternal mental health services.

References

- Avis, K., & Bowen, A. (2004). *Postpartum depression support program evaluation*. Retrieved July 10, 2012, from: http://www.usask.ca/cuistr/docs/pub_doc/health/AvisBowen.pdf.
- Aubry, T., Pantin, S., Riesin, E., Runnels, V., Swenson, R., MacPhee, C., Gillis, K., Klink, D., Lynch, E., Busing, N., & Clinch, J. (2006). *An evaluation of the Ottawa Shared Mental Health Care (SHARE) Project: Findal Report*. Retrieved on August 08, 2011, from www.opop.ca/CMFiles/Publications/.../Share%20Final%20Report.pdf.
- Ballenger, J. C., Davidson, J. R. T., Lecrubier, Y., Nutt, D. J., Kirmayer, L. J., Lépine, J. P., Lin, K. M., Tajima, O., & Ono, Y. (2001). Consensus statement on transcultural issues in depression and anxiety from the International Consensus Group on Depression and Anxiety. *Journal of Clinical Psychiatry*, 62(13), 47-55.
- Barker, D. J. P. (1995). The foetal origins of adult disease. *Biological Science*, 262, 37-43.
- Beeghly, M., Weinberg, M. K., Olson, K. L., Kernan, H., Riley, J. M., & Tronick, E. Z. (2002). Stability and change in level of maternal depressive symptomatology during the first postpartum year. *Journal of Affective Disorders*, 71, 169-180.
- Bloch, M., Rotenberg, N., Koren, D., & Klein, E. (2006). Risk factors for early postpartum depressive symptoms. *General Hospital Psychiatry*, 28(1), 3-8.
- Bowen, A., Baetz, M., Mckee, N., & Klebaum, N. (2008). Optimizing Maternal Mental Health Within A Primary Health Care Centre: A Model Program. *Canadian Journal of Community Mental Health*, 27, 105-116.
- Bowen, A., Bowen, R., Maslany, G., & Muhajarine, N. (2008). Anxiety in a socially high-risk sample of pregnant women in Canada. *Canadian Journal of Psychiatry*, 53(7), 435-40.

- Bowen, A, Stewart N, Baetz, & Muhajarine, N. (2009). Antenatal depression in socially high-risk women in Canada. *Journal of Epidemiology and Community Health*. 63, 414-6. doi:10.1136/jech.2008.078832.
- Bowen, A., Bowen, R., Butt, P., Rahman, K., & Muhajarine, N. (2012). Patterns of depression and treatment in pregnant and postpartum women. *Canadian Journal of Psychiatry*, 57(3), 161-167.
- Brouwers, E. P., van Baar, A. L., & Pop, V. J. (2001). Does the Edinburgh Postnatal Depression Scale measure anxiety? *Journal of Psychosomatic Research*, 51(5), 659-63.
- Burley, H. J. (2002). Shared care: What do family physicians want from psychiatrists? *CPA Bulletin de l'APC*, Dec, 29-31.
- Campbell, S. B. & Cohn, J. F. (1997). *The timing and chronicity of postpartum depression: implications for infant development*. In Postpartum Depression and Child Development (eds L. Murray & P. Cooper), pp. 165 -197. New York: Guilford.
- Canadian Psychiatric Association (2006). *Wait time benchmarks for patients with serious psychiatric illnesses*. Authors: Ottawa, ON.
- Cheng, C.Y., & Pickler, R. H. (2009). Effects of stress and social support on postpartum health of Chinese mothers in the United States. *Research in Nursing & Health*, 32(6), 582-591.
- Clarke, P. (2004). *Validation of two postpartum screening scales in a sample of Saskatchewan First Nations and Métis Women*. Regina: University of Regina.
- Cohen, L. S. (2005). *Mood and Anxiety Disorders during pregnancy and postpartum*. Washington DC: American Psychiatric Publishing Inc.
- Cooper, P. J., & Murray, L. (1998). Postnatal Depression: clinical review. *British Medical Journal*, 316 (7148), 1884-6.

- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150, 782-786.
- Cox, J. L. & Holden, J. M. (2003). *Perinatal mental health: A guide to the Edinburgh Postnatal Depression Scale*. Glasgow, UK: Bell & Bain Ltd.
- Cox, J.L., Chapman, G., Murray, D., & Jones, P. (1996). Validation of the Edinburgh postnatal depression scale (EPDS) in non-postnatal women. *Journal of Affective Disorders*, 39, 185-189.
- Deal, L. W., & Holt, V. L. (1998). Young maternal age and depressive symptoms: results from the 1988 National Maternal and Infant Health Survey. *American Journal of Public Health*, 88(2), 266-270. doi: 10.2105/AJPH.88.2.266.
- Esmail, N. (2009). *Waiting your turn: hospital waiting lists in Canada 2009 report*. Retrieved from <http://www.fraserinstitute.org/research-news/display.aspx?id=13589>.
- Field, M. D., Hernandez-Reif, M., Schanberg, S., Kuhn, C., Yando, R., & Bendell, D. (2002). Prenatal depression effects on the foetus and neonate in different ethnic and socio-economic status groups. *Journal of Reproductive and Infant Psychology*, 20, 149-157.
- Friis, R. H., & Sellers, T. A. (2009). *Epidemiology for Public Health Practice*. Mississauga, ON: Jones and Bartlett Publishers International.
- Green, S., & Salkind, N. (2011). *Using SPSS for Windows and Macintosh: Analyzing and Understanding Data (6th ed)*. Boston, MA: Pearson Education, Inc.
- Goodman, J. H. (2004). Postpartum depression beyond the early postpartum period. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 33(4), 410-420.

- Heron, J., O'Connor, T. G., Evans, J., Golding, J., Glover, V., & the ALSPAC Study Team. (2004). The course of anxiety and depression through pregnancy and the postpartum in a community sample. *Journal of Affective Disorders*, 80(1), 65-73.
- Hobbs, H., Wilson, J. H., & Archie, S. (2004). Evaluation of the Alumni Program. A shared-care model for psychosis. *Journal of Psychosocial Nursing and Mental Health Services*, 42(1), 28-36.
- Horowitz, J. A., & Goodman, J. (2004). A longitudinal study of maternal postpartum depression symptoms. *Research and Theory for Nursing Practice*, 18(2-3), 149-63.
- Issel, L. M. (2009). *Health program planning and evaluation* (2nd ed.). Mississauga, ON: Jones and Bartlett Publishers.
- Kates, N., Crustolo, A. M., Farrar, S., & Nikolaou, L. (2002). Counselors in primary care: benefits and lessons learned. *Canadian Journal of Psychiatry*, 47, 857-62.
- Kates, N., Craven, M., Crustolo, A.M., Nikolaou, L., & Allen, C. (1997). Integrating mental health services within primary care: a Canadian program. *General Hospital Psychiatry*, 19, 324-32.
- KidsFirst. (2002). *Annual Report*. City: Saskatchewan Learning.
- Le, H. N., Munoz, R. F., Soto, J. A., Delucchi, K., & Ippen, C. G. (2004). Identifying risk for onset of major depressive episodes in low-income Latinas during pregnancy and postpartum. *Hispanic Journal of Behavioral Science*, 26, 463-482.
- Leigh, B., & Milgrom, J. (2008). Risk factors of antenatal depression, postnatal depression and parenting stress. *BioMed Central Psychiatry*, 8, 24.

- Lieb, R., Isensee, B., Hofler, M., Pfister H., Hu, W. (2002). Parental major depression and the risk of depression and other mental disorders in offspring: A prospective-longitudinal community study. *Archives of General Psychiatry*, 59, 365-74.
- Limlomwongse, N. & Liabsuetrakul, T. (2006). Cohort study of depressive mood in Thai women during late pregnancy and 6-8 weeks of postpartum using the Edinburgh Postnatal Depression Scale (EPDS). *Archives of Women's Mental Health*, 9 (3), 131-138.
- Maki P., Veijola J., Rasanen, P., Joukamaa, M., Valonen, P., Jokelainen, J., & Isohanni, M. (2003). Criminality in the offspring of antenatally depressed mothers: a 33-year follow-up of the Northern Finland 1966 Birth Cohort. *Journal of Affective Disorders*, 74, 273-8.
- Marcus, S., Flynn, H. A., Blow, F. C., & Barry, K. L. (2003). Depressive Symptoms among Pregnant Women Screened in Obstetrics Settings. *Journal of Women's Health*, 12(4), 373-380. doi:10.1089/154099903765448880.
- Matthey, S. (2008). Using the Edinburgh postnatal depression scale to screen for anxiety disorders. *Depression and Anxiety*. 25 (11), 926-931.
- Matthey, S, Henshaw, C., Elliott, S., & Barnett, B. (2006). Variability of use of cut-off scores and formats on the Edinburgh Postnatal Depression Scale – implication for clinical and research practice. *Archives of Women's Mental Health*, 9, 309-315.
- Mayberry, L., Horowitz, J. A., & Declercq, E. (2007). Depression symptom prevalence and demographic risk factors among U. S. women during the first 2 years postpartum. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 36(6), 542-549.
- McCoy, S. J., Beal, J. M., Saunders, B., Hill, E. N., Payton, M. E., & Watson, G. H. (2008). Risk factors for postpartum depression: a retrospective investigation. *The Journal of Reproductive Medicine*, 53(3), 166-170.

- Murray, L., & Cooper, P. J. (Eds.). (2003). *Intergenerational transmission of affective and cognitive processes associated with depression: infancy and the pre-school years*. Oxford: Oxford University Press.
- Murray, L, Cooper, P. J., & Hipwell, A. (2003). Mental health of parents caring for infants. *Archives of Women's Mental Health*, 6 (supp 2), s71-s74.
- Saumuels, S. L., Witmer, J. A., & Schaffner, A. (2012). *Statistics for the life science*. Boston, MA: Wadsworth Cengage Learning.
- Pearlstein, T., Howard, M., Salisbury, A., & Zlotnick, C. (2009). Postpartum depression. *American Journal of Obstetrics and Gynaecology*, 200 (4), 357-369.
- Phillips, J., Charles, M., Sharpe, L. & Matthey, S. (2009). Validation of the subscales of the Edinburgh Postnatal Depression Scale in a sample of women with unsettled infants. *Journal of Affective Disorders*, 118, 101-112.
- Pope, S. (2000). *An information paper: Postnatal depression: A systematic review of published scientific literature to 1999*. National Health and Medical Research Council (NHMRC).
- Poulton, W., & West, M. A. (1999). The determinants of effectiveness in primary health care teams. *Journal of Interprofessional Care*, 13, 7-13.
- Rich-Edwards, J. W., Kleinman, K., Abrams, A., Harlow, B. L., McLaughlin, T. J., Joffe, H., & Gillman, M. W. (2006). Sociodemographic predictors of antenatal and postpartum depressive symptoms among women in a medical group practice. *Journal of Epidemiology Community Health*, 60, 221–227. doi: 10.1136/jech.2005.039370.
- Robertson, E., Grace, S., Wallington, T., & Steward, D. E. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *General Hospital Psychiatry*, 26, 289-295.

- Rockman, P., Salach, L., Gotlib, D., Cord, M., & Turner, T. (2004). Shared mental health care: model for supporting and mentoring family physicians. *Canadian Family Physician*, 50, 341-6.
- Ross, L. E., Gilbert Evans, S. E., Sellers, E. M., & Romach, M. K. (2003). Measurement issues in postpartum depression part 1: Anxiety as a feature of postpartum depression. *Achieves of Women's Mental Health*, 6(1), 51-57.
- Rubertsson, C., Wickberg, B., Gustavsson, P., & Radestad, I. (2005). Depressive symptoms in early pregnancy, two months and one year postpartum – prevalence and psychosocial risk factors in a national Swedish sample. *Archives of Women's Mental Health*, 8(2), 97-104.
- Statistics Canada (2011). *Female Population*. Retrieved from http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.pgm?Lang=E&AS_Sort=0&ChunkStart=1&ChunkSize=25&ResultTemplate=%2FStu-Etu%2FStu-Etu6&AS_Action=Find&AS_Theme=-1&AS_Date=.&AS_Ser=.&AS_Auth=.&AS_Univ=6&AS_Srch=female+population&AS_Btn=Search.
- Thielke, S. Vannoy, S., & Unützer, J. (2009). Integrating mental health and primary care. *Primary Care: Clinics in Office Practice*, 34 (3), 571-592.
- Thessedre, F., & Chabrol, H. (2004). Detecting women at risk of postnatal depression using the EPDS at 2-3 days postpartum. *Canadian Journal of Psychiatry*, 49, 111-114.
- Tuohy, A., & McVey, C. (2008). Subscales measuring symptoms of non-specific depression, anhedonia, and anxiety in the Edinburgh Postnatal Depression Scale. *British Journal of Clinical Psychology*, 47(2), 153-169.

- Wahn, E. H., & Nissen, E. (2008). Sociodemographic background, lifestyle and psychosocial conditions of Swedish teenage mothers and their perception of health and social support during pregnancy and childbirth. *Scandinavian Journal of Public Health*, 36(4), 415-23.
- Webster, J., Linnane, J. W., Dibley, L. M., Hinson, J. K., Starrenburg, S. E., & Roberts, J. A. (2000). Measuring social support in pregnancy: can it be simple and meaningful? *Birth*, 27(2), 97-101.
- Weissman, M.M., Feder, A., Pilowsky, D. J., Olfson, M., Fuentes, M., Blanco, C., Lantigua, R., Gameroff, M.J., & Shea, S. (2004). Depressed mothers coming to primary care: maternal reports of problems with their children. *Journal of Affective Disorders*, 78(2), 93-100.

CHAPTER 4 IMPLICATIONS AND CONCLUSIONS

My professional experiences, my passion for mental health, and my personal experiences as a mother have inspired me to explore maternal mental health and to try and make a connection with women who suffer from maternal depression. The evaluation of the MMHP gave me the opportunity to gain a deeper understanding of maternal mental health and of the women who participated in this specialized program.

4.1 Implications

This study affirms three major implications for practice: 1) the importance of social determinants of health in the development of mental health problems; 2) the need for screening and treating all pregnant and postpartum women for maternal depression and anxiety; and 3) the shared care approach is an effective alternative to addressing maternal mental health issues.

4.1.1 Addressing social determinants of health

The relationship between social determinants of health and maternal mental health status has been well established. Our findings confirmed that maternal depression and anxiety were significantly associated with the social determinants of health, particularly, financial concerns and social support. Hence, in order to improve maternal mental health, the social determinants of health must be addressed.

For health care professionals, it is very important to be aware of this vulnerable group of women who may be under financial strain, and who may lack a social support network. Well informed and appropriately trained health care professionals are needed in order to strongly advocate for these women and help guide them towards community resources that could provide social support and may assist them in meeting their financial needs.

4.1.2 Screening for maternal depression and anxiety

Despite the increased prevalence and potential impact of maternal mental illness on childbearing women and their children, the majority of women do not seek help, and their symptoms are too often overlooked or undertreated by caregivers (Cohen, 2005; Pearlstein, Howard, Salisbury, & Zlotnick, 2009). One study in the US found that rates of screening for postpartum depression were less than 50% in primary health care settings; and when family physicians did screen, only 22% of them used valid tools (Seehusen, Baldwin, Runkle, & Clark, 2005). A recent study demonstrated that depressive symptoms improve, particularly among women who received appropriate treatment during their pregnancy and postpartum period (Bowen, Bowen, Butt, Rahman, & Muhajarine, 2012).

In order to diagnose and treat depression and anxiety during pregnancy and postpartum, screening is the key. There are programs across Canada to address the issue of screening and treating women for depression during pregnancy and postpartum (BC Reproductive Mental Health Program, 2006; Best Start, Ontario Prevention Clearinghouse, 2007; Bowen, 2010). These programs encourage screening for all women with the Edinburgh Postnatal Depression Scale (EPDS). Health care professionals need to acquire an increased awareness of the importance of screening and encourage pregnant and postpartum women to participate in such programs.

4.2 Knowledge Translation and Exchange

Knowledge translation activities regarding this study have been ongoing since early 2012. The results of this research endeavour have been presented orally and as posters at various conferences: 1) the Life & Health Sciences Research Day Conference at the University of Saskatchewan, Saskatoon, SK, in March 2012 (Won 2nd prize); 2) the Canadian Society for

Epidemiology and Biostatistics National Student Conference 2012, University of Saskatchewan, SK, in May 2012 (Won 3rd place); 3) the Maternal Mental Health Advisory Committee Meeting, Saskatoon SK, in June 2012; 4) the 13th Canadian Collaborative Mental Health Care Conference, Vancouver, BC, in June, 2012; and 5) the Saskatchewan Epidemiology Association Symposium 2012, Saskatoon, SK, in October 2012 (Won 1st prize). Additionally, an Abstract of Evaluation of the Maternal Mental Health Program was published in the July, 2012 issue of The American Journal of Epidemiology.

4.3 Future Research

A close relationship between anxiety and depression has been consistently reported, and antenatal depression has been recognized as a mediator of postpartum depression. Further research could include a study of antenatal depression and anxiety based on different gestation stages and time of postpartum and effectiveness of treatment, and a study of relationship between maternal depression and anxiety.

A qualitative research project may be beneficial to further understand the services of the MMHP. A focus group or/and a face-to-face interview can be employed to explore the experiences of women and physicians with the MMHP. This could include a discussion of which aspects of the MMHP satisfied their needs and met their expectations, and which area(s) of the MMHP should be further improved.

4.4 Conclusion

Mental health problems, particularly depression and anxiety, are increasing worldwide and are placing a major burden on individuals, families, and society. Despite the increased prevalence and the potential impact of maternal mental illness on childbearing women, the majority of affected women are either undiagnosed or not treated. Different health delivery

models have been developed to improve patient's care including the shared care model. Shared care has been proven to enhance the collaboration between primary care physicians and specialty care physicians, decrease stigma, increase client and caregiver satisfaction, and decrease use of traditional mental health services (Kates et al., 2002). The Maternal Mental Health Program (MMHP) was developed to improve the mental health of pregnant and postpartum women in the SHR, and used a shared care approach. A quantitative evaluation of the MMHP was undertaken in 2011 to assess the progress made by the MMHP.

This evaluation found that there was a significant reduction of depression and anxiety symptoms, particularly, in women who were depressed and/or anxious at the time of intake. Some social determinants of health such as financial concerns, unemployment status, and lack of social support were associated with these symptoms. The majority of women and physicians were satisfied with the program. This evaluation suggested that the implementation and maintenance of a shared care maternal mental health program are feasible and beneficial. It further suggests that in order to improve maternal mental health, the social determinants of health that impact the mental health of these women have to also be taken into consideration and whenever possible addressed.

It is hoped that this evaluation of the MMHP can result in further improvements of the MMHP overall. Particularly, the evaluation helps to draw attention to maternal mental health issues, the positive outcomes of shared care models for improving maternal mental health outcome, and increased attention to the social determinants of health within the SHR.

REFERENCES

- American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders 3rd edition, Text Revision (DSM-III)*. New Jersey: Lawrence Erlbaum Association.
- American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders 4th edition, Text Revision (DSM-IV-TR)*. New Jersey: Lawrence Erlbaum Association.
- Aubry, T., Pantin, S., Riesin, E., Runnels, V., Swenson, R., MacPhee, C., Gillis, K., Klink, D., Lynch, E., Busing, N., & Clinch, J. (2006). *An evaluation of the Ottawa Shared Mental Health Care (SHARE) Project: Final Report*. Retrieved from www.opop.ca/CMFiles/Publications/.../Share%20Final%20Report.pdf.
- Bandelow, B. (2003). Epidemiology of Depression and Anxiety. In Kasper, S., den Boer, J. A., & Ad Sitsen, J. M. (Eds.), *Handbook of Depression and Anxiety* (pp. 49-68). New York, NY: Marcel Dekker, Inc..
- Barker, D. J. P. (1995). The foetal origins of adult disease. *Biological Science*, 262, 37-43. American Psychiatric Publishing Inc.
- BC Reproductive Mental Health Program (2006). *Addressing perinatal depression: A framework for BC's Health Authorities*. Retrieved from http://www.health.gov.bc.ca/library/publications/year/2006/MHA_PerinatalDepression.pdf.
- Beck, C. T. (2001). Predictors of postnatal depression: an update. *Journal of Nursing Research*, 50(5), 275–285.

- Bellingham-Young, D. A., & Adamson- Macedo, E. N. (2003). Fetal origins theory: Links with adult depression and general self-efficacy. *Neuroendocrinology Letter*, 24(6), 412-6.
- Best Start, Ontario Prevention Clearinghouse (2007). *Postpartum Mood Disorders Campaign 2007*. Retrieved from www.lifewithnewbaby.ca.
- Bieling, P. J., Antony, M. M., & Swinson, R. P. (1998). The State-Trait Anxiety Inventory, trait version: structure and content re-examined. *Behaviour Research and Therapy*, 36 (7-8), 777-788.
- Bowen, A., & MotherFirst Working Group (2010). *Maternal mental health strategy: building capacity in Saskatchewan*. Retrieved from <https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxtYXRlcm5hbG1lbnRhbGhYWX0aHNrfGd4Ojg4OTNhZjZiYjA4MzUwYw>.
- Bowen, A. N., & Muhajarine, N. (2006). Prevalence of depressive symptoms in an outreach program in Canada. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, 34, 492-498.
- Bowen, A., Bowen, R., Butt, P., Rahman, K., & Muhajarine, N. (2012). Patterns of depression and treatment in pregnant and postpartum women. *Canadian Journal of Psychiatry*, 57(3), 161-167.
- Boyce, P. M. (2003). Risk factors for postnatal depression: a review and risk factors in Australian populations. *Archives of Women's Mental Health*, 6 (2), 43-50.
- Brockington, I. (1996). *Motherhood and mental health*. Oxford: Oxford University Press.
- Centers of Disease Control and Prevention (CDC) (2008, April 11). Prevalence of self-reported postpartum depressive symptoms - 17 states, 2004 – 2005. *CDC weekly*, 57 (14), 361-366. Retrieved from <http://www.cdc.gov/mmWR/preview/mmwrhtml/mm5714a1.htm>.

- Cheng, C.Y., & Pickler, R. H. (2009). Effects of stress and social support on postpartum health of Chinese mothers in the United States. *Research in Nursing & Health*, 32(6), 582-591.
- Chomik, T. A. (2005). *A Report on Shared Care (Part of the Primary Health Care Shared Care Network Development Initiative)*. Retrieved from <http://www.phsa.ca/NR/rdonlyres/6A84F609-CCAA-40DC-BD62-B2FAC7BE2356/0/SharedCareReport2005.pdf>.
- Cohen, L. S. (2005). *Mood and Anxiety Disorders during pregnancy and postpartum*. Washington DC: American Psychiatric Publishing Inc..
- Darcy, J., Grzywacz, J., Stephens, R., Leng, I., Clinch, C., & Arcury, T. (2011). Maternal depressive symptomatology: 16-month follow-up of infant and maternal health-related quality of life. *Journal of the American Board of Family Medicine*, 24 (3), 249-257.
- Deal, L. W., & Holt, V. L. (1998). Young maternal age and depressive symptoms: results from the 1988 National Maternal and Infant Health Survey. *American Journal of Public Health*, 88(2), 266-270. doi: 10.2105/AJPH.88.2.266.
- Dennis, C. L., & McQueen, K. (2009). The relationship between infant-feeding outcomes and postpartum depression: a qualitative systematic review. *Pediatrics*. 123(4), e736 - e751, doi: 10.1542/peds.2008-1629.
- Danial, W. W. (2009). *Biostatistics* (9th ed). Hoboken, NJ: John Wiley & Sons. Inc..
- DiPietro, J.A., Hilton, S.C., Hawkins, M., Costigan, K.A., & Pressman, E.K. (2002). Maternal stress and affect influence fetal neurobehavioral development. *Developmental Psychology*. 38, 659– 668.

- Drewett, R., Blair, P., Emmett, P., & Emond A. (2004). Failure to thrive in term and preterm infants of mothers depressed in the postnatal period: a population-based birth cohort study. *Journal of Child Psychology Psychiatry & Allied Disciplines*, 45(2), 359-66.
- Einarson, A., & Koren, G. (2007). Risks of untreated depression during pregnancy. In G. Koren Ed.), *Medication safety in pregnancy & breastfeeding: the evidence-based, A-to-Z clinician's pocket guide* (pp. 293-294). US: The McGraw-Hill Companies.
- Ettorre, E. (2010) (Ed.). *Culture, bodies and the sociology of health*. Burlington, VT: Ashgate.
- Evans, J., Heron, J., Francomb, H., Oke, S., & Golding, J. (2001). Cohort study of depressed mood during pregnancy and after childbirth. *British Medical Journal*, 323, 257–260.
- Field, T., Diego, M., Hernandez-Reif, M., Figueiredo, B., Deeds, O., Ascencio, A., Schanberg, S., & Kuhn, C. (2010). Comorbid depression and anxiety effects on pregnancy and neonatal outcome. *Infant Behavior and Development*, 33(1), 23-29.
- Flores, D. L., & Hendrick, V. C. (2002). Etiology and treatment of postpartum depression. *Current Psychiatry Reports*, 4(6), 461-6.
- Foucault, M. (1965). *Madness and Civilization: A History of Insanity in the Age of Reason*. New York: Vintage Books.
- Galler, J. R., Harrison, R. H., Ramsey, F., Forde, V., & Butler, S. C. (2000). Maternal depressive symptoms affect infant cognitive development in Barbados. *Journal of Child Psychology and Psychiatry*, 41(6), 747–757.
- Galler, J. R., Ramsey, F., Butler, S. C., & Forde, V. (2004). Postpartum maternal mood, feeding practices, and infant temperament in Barbados. *Infant Behavior and Development*, 27(3), 267–287.

- Government of Canada (2012). *Future Demographic Trends May Help Canada's Aboriginal Youth*. Retrieved from www.csc_scc.gc.ca/text/pblct/forum/e143/e143e_eshtml.
- Green, J.M., & Murray, D. (1994). The use of the Edinburgh Postnatal Depression Scale in research to explore the relationship between antenatal and postnatal dysphoria. In Cox, J., & Holden, J. (Eds.), *Perinatal Psychiatry Use and Misuse of the Edinburgh Postnatal Depression Scale* (pp. 180– 198). London: Gaskell.
- Glover, V., Teixeira, J. M. A., Gitau, R., & Fisk, N. M. (1999). Mechanisms by which maternal mood in pregnancy may affect the fetus. *Contemporary Review of Obstetrics and Gynaecology*, 11, 1-6.
- Goldberg, P., Guéguen, A., Schmaus, A., Nakache, J. P., & Goldberg, P. (2001). Longitudinal study of associations between perceived health status and self reported diseases in the French Gazel cohort. *Epidemiology Community Health*, 55, 233-238.
- Goodman, J. H. (2004). Paternal postpartum depression, its relationship to maternal postpartum depression, and its implications for family health. *Journal of Advanced Nursing*, 45(1), 26-35.
- Grote, N. K., Bridge, J. A., Gavin, A. R., Melville, J. L., Iyengar, S., & Katon, W. J. (2010). A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction. *Achieves of General Psychiatry* 67(10), 1012-1024.
- Hansen, D., Lou, H.C., & Olsen, J. (2000). Serious life events and congenital malformations: a national study with complete follow- up. *Lancet*, 356, 875–880.

- Hatton, D., Harrison-Hohner, J., Coste, S., Dorato, V., Curet, L., & McCarron, A. (2005). Symptoms of postpartum depression and breastfeeding. *Journal of Human Lactation*, 21(4), 444-449. DOI: 10.1177/0890334405280947.
- Hedegaard, M., Henriksen, T.B., Sabroe, S., & Secher, N.J. (1993). Psychological distress in pregnancy and preterm delivery. *British Medical Journal*, 307, 234–239.
- Henderson, J. J., Evans, S. F., Straton, J. A. Y., Priest, S. R., & Hagan, R. (2003). Impact of postnatal depression on breastfeeding duration. *Birth*, 30(3), 175-80.
- Heron, J., O'Connor, T. G., Evans, J., Golding, J., Glover, V., & ALSPAC Study Team (2004). The course of anxiety and depression through pregnancy and the postpartum in a community sample. *Journal of Affective Disorders*, 80(1), 65-73.
- Himmelhoc, H. J., Levine, J., & Gershon, S. (2001). Historical overview of the relationship between anxiety disorders and affective disorders. *Depression and Anxiety*, 14, 53–66.
- Holmes, T. H., & Rahe, R. H. (1967). The Social readjustment rating scale. *Journal of Psychosomatic Research*, 11, 213–8.
- Howell, E. A., Mora, P. A., Horowitz, C. R., & Leventhal, H. (2005). Racial and ethnic differences in factors associated with early postpartum depressive symptoms. [Comparative Study Research Support, Non-U.S. Gov't Research Support, U.S. Gov't, P.H.S.]. *Obstetrics & Gynecology*, 105(6), 1442-1450.
- Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: a review of twenty-seven community studies. *Journal of Health and Social Behavior*, 38(1), 21–37.
- Issel, L. M. (2009). *Health program planning and evaluation* (2nd ed.). Mississauga, ON: Jones and Bartlett Publishers.

- Jameson, J. P., & Blank, M. B. (2010). Diagnosis and treatment of depression and anxiety in rural and nonrural primary care: national survey results. *Psychiatric Services*, 61(6), 624-627.
- Johanson, R., Chapman, G., Murray, D., Johnson, I., & Cox, J. (2000). The North Staffordshire Maternity Hospital prospective study of pregnancy-associated depression. *Journal of Psychosomatics Obstetric Gynaecology*, 21(2), 93-97.
- Johnstone, S.J., Boyce, P.M., Hickey, A.R., Morris-Yates, A.D., & Harris, M.G. (2001). Obstetric risk factors for postnatal depression in urban and rural community samples. *Australian and New Zealand Journal of Psychiatry*, 35 (1), 69–74.
- Jomeen, J., & Martin, C. R. (2004). Is the Hospital Anxiety and Depression Scale (HADS) a reliable screening tool in early pregnancy? *Psychology and Health*, 19(6), 787-800.
- Josefsson, A., Berg, G., Nordin, C., & Sydsjo, G. (2001). Prevalence of depressive symptoms in late pregnancy and postpartum. *Acta Obstetricia et Gynecologica Scandinavica*, 80, 251–255.
- Kammerer, M., Taylor, A., & Glover, V. (2006). The HPA axis and perinatal depression: a hypothesis. *Archives of Women’s Mental Health*, 9, 187-196.
- Kates, N., & Ackerman, S. (editors) (1996). *Shared Mental Health in Canada: A Compendium of Current Projects*, p. 46. Produced by the Canadian Psychiatric Association and the College of Family Physicians of Canada, Collaborative Working Group on Shared Mental Health Care. Retrieved from www.ccmhi.ca/en/products/documents/compendium.pdf.
- Kates, N., Craven, M., Webb, S., Low, J., & Perry, K. (1992). Case reviews in the family physician’s office. *Canadian Journal of Psychiatry* 37(1), 2-6.

- Katon, W., Von Korff, M., Lin, E., Walker, E., Simon, G., Bush, T., Robinson, R., & Russo, J. (1995). Collaborative management to achieve treatment guidelines: impact on depression in primary care. *Journal of American Medical Association*, 273(13), 1026-31.
- Kendler, K. S., Walters, E. E., Neale, M. C., Kessler, R. C., Heath, A. C., & Eaves, L. J. (1995). The structure of the genetic and environmental risk factors for six major psychiatric disorders in women: phobia, generalized anxiety disorder, panic disorder, bulimia, major depression, and alcoholism. *Archives of General Psychiatry*, 52: 374–383.
- Kessler, R. C., McGonagle, K. A., Zhao, S., Nelson, C. B., Hughes, M., & Eshleman, S. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the national comorbidity survey. *Archives of General Psychiatry*, 51, 8-19.
- Kessler, R.C., Nelson, C. B., McGonagle, K. A., Liu, J., Swartz, M., & Blazer, D. G. (1996). Comorbidity of DSM-III-R major depressive disorder in the general population: Results from the U.S. National Comorbidity Survey. *British Journal of Psychiatry*, 168 (30), 8–21.
- Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of twelve-month DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry*, 62(6), 617-27.
- Kitamura, T., Sugawara, M., Sugawara, K., Toda, M. A., & Shima, S. (1996). Psychosocial study of depression in early pregnancy. *British Journal of Psychiatry*, 168, 732–738.
- Kornstein, S. G., & Clayton, A. H. (Eds.) (2002). *Women's mental health: A comprehensive textbook*. New York: The Guilford Press.

- Kurki, T., Raitasalo, R., Mattila, H., & Ylikorkala, O. (2000). Depression and anxiety in early pregnancy and risk for preeclampsia. *Obstetrics & Gynecology*, 95(4), 487-90.
- Lee, D. T., Yip, A. S., Leung, T. Y., & Chung, T. K. (2006). Identifying women at risk of postnatal depression: prospective longitudinal study. *Hong Kong Medical Journal*, 6, 349–54.
- Leung, B., Luo, N., So, L., & Quan, H. (2007). Comparing three measures of health status (perceived health with Likert-type scale, EQ-5D, and number of chronic conditions) in Chinese and white Canadians. *Medical Care*, 45(7), 610–7.
- Lieb, R., Isensee, B., Hofler, M., Pfister, H., & Hu, W. (2002). Parental major depression and the risk of depression and other mental disorders in offspring: A prospective-longitudinal community study. *Archives of General Psychiatry*, 59, 365-74.
- Llewellyn, A.M., Stowe, Z.N., & Nemeroff, C.B. (1997). Depression during pregnancy and the puerperium. *Journal of Clinical Psychiatry*, 58 (2), 26–32.
- Lommatzsch, M., Hornyk, K., Zingler, C., Peter Schuff-Werner, P., Höppner, J., & Virchow, C. (2006). Maternal serum concentrations of BDNF and depression in the perinatal period. *Psychoneuroendocrinology*, 31(3), 388–394.
- Magiakou, M. A., Mastorakos, G., Webster, E., & Chrousos, G. P. (1997). The hypothalamic-pituitary-adrenal axis and the female reproductive system. *Annals of the New York Academy of Sciences*, 816, 42–56.
- Mandl, K. D., Tronick, E. Z., Brennan, T. A., Alpert, H. R., & Homer, C. J. (1999). Infant Health Care Use and Maternal Depression. *Archives of Pediatrics & Adolescent Medicine*, 153, 808-813.

- Marcus, S., Flynn, H. A., Blow, F. C., & Barry, K. L. (2003). Depressive Symptoms among Pregnant Women Screened in Obstetrics Settings. *Journal of Women's Health, 12*(4), 373-380. doi:10.1089/154099903765448880.
- Matthey, S., Barnett, B., Howie, P., & Kavanagh, D.J. (2003). Diagnosing postpartum depression in mothers and fathers: whatever happened to anxiety? *Journal of Affective Disorders, 74* (2), 139–147.
- Mauthner, N. S. (2002). *The darkest days of my life: Stories of postpartum depression*. Cambridge: Harvard University Press.
- McLean, C. P., Asnaani, A., Litz, B. T., & Hofmann, S. G. (2011). Gender differences in anxiety disorders: prevalence, course of illness, comorbidity and burden of illness. *Journal of Psychiatric Research, 45* (8), 1027-1035.
- Mechanic, D. (1997). Approaches for coordinating primary and specialty care for persons with mental health illness. *General Hospital Psychiatry, 19*, 395-402.
- Misri, S., Kim, J., Riggs, K. W., & Kostaras, X. (2000). Paroxetine levels in postpartum depressed women, breast milk, and infant serum. *Journal of Clinical Psychiatry, 61*, 828–832.
- Moorehead, R. (1995). Sharing care between allied health professional and general practitioners. *Australian Family Physician, 24*(11).
- Muhajarine, N., D'Arcy, C., & Edouard, L.(1997). Prevalence and predictors of health risk behaviors during early pregnancy: Saskatoon pregnancy and health study. *Canadian Journal of Public Health. 88*(6), 375-379.
- Murray, D., & Cox, J.L. (1990). Screening for depression during pregnancy with the Edinburgh Depression Scale (EPDS). *Journal of Reproductive and Infant Psychology, 8*, 99–107.

- Murray, C. J., & Lopez, A. D. (1996). Evidence-based health policy-lessons from the global burden of disease study. *Science*, 274 (5288), 740-743.
- Murray, L, Cooper, P. J., & Hipwell, A. (2003). Mental health of parents caring for infants. *Archives of Women's Mental Health*, 6 (supp 2), s71-s74.
- Murray, L., & Cooper, P. J. (Eds.). (2003). *Intergenerational transmission of affective and cognitive processes associated with depression: infancy and the pre-school years*. Oxford: Oxford University Press.
- Myers, R. (1975). Maternal psychological stress and fetal asphyxia: A study in the monkey. *American Journal of Obstetrics and Gynecology*, 122, 47–59.
- Najman, J. M., Morrison, J., Williams, G, Williams, G, Andersen, M., & Keeping, J. D. (1991). The mental health of women 6 months after they give birth to an unwanted baby: A longitudinal study. *Social Science & Medicine*, 32, 241-247.
- National Institute for Health & Clinical Excellence (2007). *Anxiety: management of anxiety*. Retrieved from: www.nice.org.uk/nicemedia/pdf/CG022quickrefguideamended.pdf.
- O'Connor, T. G., Heron, J., Glover, V., & the ALSPAC study team. (2002). Antenatal anxiety predicts child behavioral/emotional problems independent of postnatal depression. *Journal of the American Academy of Child & Adolescent Psychiatry*, 41, 1470– 1477.
- O'Hara, M., & Swain, A. (1996). Rates and risk of postpartum depression: a meta-analysis. *International Review of Psychiatry*, 8, 37–54.
- Ostlund, H., Keller, E., & Hurd, Y. L. (2003). Estrogen receptor gene expression in relation to neuropsychiatric disorders. *Annals of the New York Academy of Science*, 1007, 54–63.
- Pearlstein, T., Howard, M., Salisbury, A., & Zlotnick, C. (2009). Postpartum depression. *American Journal of Obstetrics and Gynaecology*, 200 (4), 357-369.

- Pesonen, A., Raikkonen, K., Strandberg, T., & Jarvenpaa, A. (2005). Continuity of maternal stress from the pre- to postnatal period: association with infant's positive, negative, and overall temperamental reactivity. *Infant Behavior and Development*, 28, 36–47.
- Pollack, M. (2005). Comorbid anxiety and depression. *Journal of Clinical Psychiatry*, 66, 22–29.
- Pop, V. J., Essed, G. G., de Geus, C. A., Van Son, M. M., & Komproe, I. H. (1993). Prevalence of postpartum depression or is it post-puerperium depression? *Acta Obstetricia et Gynecologica Scandinavica*, 72, 354-358.
- Pope, S. (2000). *An information paper: postnatal depression: A systematic review of published scientific literature to 1999*. Australia: National Health and Medical Research council.
- Psychiatric Canadian Association (2001). Canadian clinical practice guidelines for the treatment of depressive disorders. *Canadian Journal of Psychiatry*, 46 (Suppl).
- Public Health Agency of Canada (2002). *A Report on Mental Illness in Canada*. Retrieved from http://www.phac-aspc.gc.ca/publicat/miic-mmacc/chap_4-eng.php.
- Quinlivan, J. A., Petersen, R. W., & Gurrin, L. C. (1999). Adolescent pregnancy: Psychopathology missed. *Australian and New Zealand Journal of Psychiatry*, 33, 864-868.
- Rakel, R.E. (2007). *Textbook of family medicine (7th ed.)*. Philadelphia, PA: Saunders Elsevier.
- Ramchandani, P.G., Stein, A., Hotopf, M., & Wiles, N. J. (2006). Early parental and child predictors of recurrent abdominal pain at school age: results of a large population-based study. *Journal of the American Academy of Child & Adolescent Psychiatry*, 45(6), 729–736.

- Rich-Edwards, J.W., Kleinman, K., Abrams, A., Harlow, B. L., McLaughlin, T. J., Joffe, H., & Gillman, M. W. (2006). Sociodemographic predictors of antenatal and postpartum depressive symptoms among women in a medical group practice. *Journal of Epidemiology Community Health, 60*, 221–227. doi: 10.1136/jech.2005.039370.
- Ritter, C., Hobfoll, S. E., Lavin, J., Cameron, R. P., & Hulsizer, M. R. (2000). Stress, psychosocial resources, and depressive symptomatology during pregnancy in low-income, inner-city women. [Multicenter Study Research Support, Non-U.S. Gov't Research Support, U.S. Gov't, P.H.S.]. *Health Psychology, 19*(6), 576-585.
- Robertson, E., Grace, S., Wallington, T., & Steward, M. D. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *General Hospital Psychiatry, 26* (4), 289–295.
- Robinson, G. E., & Stewart, D. E. (2001). Postpartum disorders. In Stotland, N. L., & Stewart, D. E. (Eds). *Psychological aspects of women's health care* (pp. 117-139). Washington (DC): American Psychiatric Press.
- Ross, L. E., Gilbert Evans, S. E., Sellers, E. M., & Romach, M. K. (2003). Measurement issues in postpartum depression part 1: Anxiety as a feature of postpartum depression. *Archives of Women's Mental Health, 6*, 51-57.
- Ross, L. E., & Mclean, L. M. (2006). Anxiety disorder during pregnancy and the postpartum period: a systematic review. *Journal of Clinical Psychiatry, 67*(8), 1285-1298.
- Sawatzky, R., Ratner, P. A., Johnson, J. L., Kopec, J. A., & Zumbo, B. D. (2010). Self-reported physical and mental health status and quality of life in adolescents: a latent variable mediation model. *Health and Quality of Life Outcomes, 8* (17).

- Seehusen, D. A., Baldwin, L. M., Runkle, G. P., & Clark, G. (2005). Are family physicians appropriately screening for postpartum depression? *Journal of American Board of Family Medicine, 18*, 104–12.
- Statistics Canada (2002). *Mental Health and Well-being Survey Canadian Community Health Survey*. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/030903/dq030903a-eng.htm>.
- Starcevic, V. (2010). *Anxiety Disorders in Adults* (2nd ed.). New York, New York: Oxford University Press, Inc..
- Stein, A., Craske, M. G., Lehtonen, A., Harvey, A., Savage-McGlynn, E., Davies, B., Goodwin, J., Murray, L., Cortina-Borja, M., & Counsell, N. (2012). Maternal Cognitions and Mother–Infant Interaction in Postnatal Depression and Generalized Anxiety Disorder. *Journal of Abnormal Psychology*. Advance online publication. doi: 10.1037/a0026847.
- Steiner, M., & Tam, W. (1999). *Postpartum depression in relation to other psychiatric disorders*. In Miller, M. J. (Ed.), *Postpartum mood disorders* (pp. 47-63). Washington (DC): American Psychiatric Press.
- Stewart, D. E., Gucciardi, E., & Grace, S.L. (2003). *Depression: Women's Health Surveillance Report*. Toronto: Health Canada. Retrieved from http://www.phac-aspc.gc.ca/publicat/whsr-rssf/pdf/WHSR_Chap_18_e.pdf.
- Sutter-Dallay, A. L., Giaconne-Marcesche, V., Glatigry-Dallay, E., & Verdoux, H. (2004). Women with anxiety disorders during pregnancy are at increased risk of intense postnatal depressive symptoms: a prospective survey of the MATQUID cohort. *European Psychiatry, 19* (8), 459–463.

- Teissèdre, F., & Chabral, H. (2004). Detecting women with postnatal depression using the Edinburgh Postnatal Depression Scale at 2 to 3 days. *Canadian Journal of Psychiatry*, 49(1), 51-54.
- Tompson, M. C., Pierre, C. B., Boger, McKowen, J. W., Chan, P. T., & Freed, R. D. (2010). Maternal depression, maternal expressed emotion, and youth psychopathology. *Journal of Abnormal Child Psychology*, 38(1), 105-117.
- Vieten, C., & Astin, J., (2008). Effects of a mindfulness-based intervention during pregnancy on prenatal stress and mood: results of a pilot study. *Archives of Women's Mental Health*, 11(1), 67-74.
- Vingilis, E., Paquette-Warren, J., Kates, N., Crustolo, A. M, Greenslade, J., & Newman, S. (2007). Descriptive and process evaluation of a shared primary care program. *The Internet Journal of Allied Health Sciences and Practice*, 5 (4).
- Wadhwa, P., Sandman, C., & Garite, T. (2001). The neurobiology of stress in human pregnancy: Implications for prematurity and development of the fetal central nervous system. *Progress in Brain Research*, 133, 131–142.
- Wan, M. W., & Green, J. (2009). The impact of maternal psychopathology on child-mother attachment. *Archives of Women's Mental Health*, 12, 123-134.
- Warner, R., Appleby, L., Whitton, A., & Faragher, B. (1996). Demographic and obstetric risk factors for postnatal psychiatric morbidity. *British Journal of Psychiatry*, 168, 607-611.
- Watson, J. P., Elliott, S. A., Rugg, A. J., & Brough, D. I. (1984). Psychiatric disorder in pregnancy and the first postnatal year. *British Journal of Psychiatry*, 144 (1984),453–462.

- Weissman, M. M., Bland, R. C., Canino, G. J., Faravelli, C., Greenwald, S., Hwu, H. G., Joyce, P. R., Karam, E. G., Lee, C. K., Lellouch, J., Lepine, J.P., Newman, S. C., Rubio-Stipec, M., Wells, J. E., Wickramaratne, P.J., Wittchen, H., & Yeh, E. K. (1996). Cross-national epidemiology of major depression and bipolar disorder. *The Journal of American Medical Association*, 276(4), 293-299.
- Weissman, M. M., Feder, A., Pilowsky, D. J., Olfson, M., Fuentes, M., Blanco, C., Lantigua, R., Gameroff, M. J., & Shea, S. (2004). Depressed mothers coming to primary care: maternal reports of problems with their children. *Journal of Affective Disorders*, 78(2), 93-100.
- Wetzler, S., & Katz, M. M. (1989). Problems with the differentiation of anxiety and depression. *Journal of Psychiatric Research*, 23, 1–12.
- WHO (2012). *Mental Health and Substance Abuse*. Retrieved from <http://www.searo.who.int/en/section1174/section1199/section1567/section1826.htm>.
- Wilkerson, D. S., Volpe, A. G., Dean, R. S., & Titus, J. B. (2002). Perinatal complications as predictors of infantile autism. *International Journal of Neuroscience*, 9(112), 1085-98.
- Wisner, K. L., Zarin, D., Holmboe, E., Appelbaum, P., Gelenberg, A. J., Leonard, H.L., & Frank, E. (2000). Risk-benefit decision making for treatment of depression during pregnancy. *American Journal of Psychiatry*, 157, 1933–1940.
- Yonkers, K. A., Ramin, S. M., Rush, A. J., Navarrete, C. A., Carmody, T., March, D., & Leveno, K. J. (2001). Onset and persistence of postpartum depression in an inner-city maternal health clinic system. [Research Support, Non-U.S. Gov't Research Support, U.S. Gov't, P.H.S.]. *American Journal of Psychiatry*, 158(11), 1856-1863.

Young, E., Abelson, J., & Cameron, O. (2004). Effect of comorbid anxiety disorders on the hypothalamic-pituitary-adrenal axis response to a social stressor in major depression.

Biological Psychiatry, 56, 113–120.

APPENDICES

APPENDIX A: MATERNAL MENTAL HEALTH PROGRAM INTAKE

THIS QUESTIONNAIRE ASKS QUESTIONS THAT ARE RELATED TO YOUR PHYSICAL AND MENTAL HEALTH. PLEASE ANSWER ALL QUESTIONS AS COMPLETELY AS POSSIBLE.

A. IF YOU ARE PREGNANT, PLEASE COMPLETE THIS SECTION AND THEN GO TO SECTION "C":

When is the baby due ? _____ how far along are you today? _____ (weeks)

For each of the following statements, please indicate how you feel about the support you have right now	Always	Most of the time	Some of the time	Rarely	Never
---	--------	------------------	------------------	--------	-------

Did you plan this pregnancy? ☐ Yes ☐ No ☐ Sort of

Do you plan to keep the baby? ☐ Yes ☐ No ☐ unsure

What birth control did you use? ☐ none ☐ condom ☐ BCP ☐ Mirena/IUD ☐ Depoprovera ☐ other

Any complications during this pregnancy? ☐ No ☐ Yes (✓check all that apply)

- | | | |
|---|--|---|
| <input type="checkbox"/> Infections (urinary, vaginal Strep B | <input type="checkbox"/> Sexually Transmitted disease (Chlamydia, gonorrhea) | |
| <input type="checkbox"/> Hepatitis | <input type="checkbox"/> HIV | <input type="checkbox"/> Rh/blood factors |
| <input type="checkbox"/> Bleeding during the pregnancy | <input type="checkbox"/> Diabetes | <input type="checkbox"/> High Blood Pressure |
| <input type="checkbox"/> Thyroid | <input type="checkbox"/> Headaches | <input type="checkbox"/> Severe Nausea/Vomiting |
| | | <input type="checkbox"/> Anemia |
| | | <input type="checkbox"/> Swelling/Edema |

Other _____

B. IF YOU HAVE HAD YOUR BABY, PLEASE COMPLETE THIS SECTION AND THEN GO TO SECTION "C":

When did you deliver? _____ How old is the baby now? _____

Is the baby healthy? ☐ Yes ☐ No, describe any problems:

Any complications during the pregnancy? ☐ No ☐ Yes (✓check all that apply)

- | | | |
|---|--|---|
| <input type="checkbox"/> Infections (urinary, vaginal Strep B | <input type="checkbox"/> Sexually Transmitted disease (Chlamydia, gonorrhea) | |
| <input type="checkbox"/> Hepatitis | <input type="checkbox"/> HIV | <input type="checkbox"/> Rh/blood factors |
| <input type="checkbox"/> Bleeding during the pregnancy | <input type="checkbox"/> Diabetes | <input type="checkbox"/> High Blood Pressure |
| <input type="checkbox"/> Thyroid | <input type="checkbox"/> Headaches | <input type="checkbox"/> Severe Nausea/Vomiting |
| | | <input type="checkbox"/> Anemia |
| | | <input type="checkbox"/> Swelling/Edema |

Other _____

Type of delivery:

☐ normal, vaginal ☐ emergency c-section ☐ planned c-section ☐ forceps/vacuum

ANY LABOUR & DELIVERY COMPLICATIONS? No ☐ Yes ☐ (✓all that apply)

- | | | |
|--|--|--|
| <input type="checkbox"/> labour was induced | <input type="checkbox"/> Premature labour | <input type="checkbox"/> high blood pressure |
| <input type="checkbox"/> water broke early | <input type="checkbox"/> problems with placenta/afterbirth | <input type="checkbox"/> excessive bleeding/hemorrhage |
| <input type="checkbox"/> Infection in mother | <input type="checkbox"/> infection in baby | |

Other:

Are you breastfeeding now? ☐ Yes ☐ No ☐ both (formula and breast).

If you are not breastfeeding now, did you breastfeed at all? ☐ Yes ☐ No
if yes, how long did you breastfeed without supplementing with formula? _____

C. ALL WOMEN

Are you? ☐single ☐ CL ☐married ☐divorced/separated ☐widowed

In general, how would you describe your relationship? ☐no partner ☐ a lot of tension ☐ some tension ☐ no tension

I have good friends who support me					
My family is always there for me					
My husband/partner helps me a lot					
There is conflict with my husband/partner					
I feel controlled by my husband/partner					
I feel loved by my husband/partner					

Do you and your partner work out arguments? ☐no partner ☐ with great difficulty ☐ some difficulty ☐ no difficulty

Did/are you having trouble conceiving? ☐No ☐Yes, describe

Did you use any kind of assisted reproduction, in-vitro fertilization, clomid, surrogacy? ☐Yes ☐No

Are you interested in or did you attend Prenatal Classes? ☐Yes ☐No ☐Undecided

Do you have any legal problems? ☐Yes ☐No

D. THE FOLLOWING QUESTIONS ASK ABOUT DIFFERENT THINGS THAT MAY AFFECT YOUR MENTAL HEALTH:

Do you have a history of PMS? ☐Yes☐No

When did it start? Age____ ☐before or ☐after pregnancies

Treated? ☐Yes ☐No Medication? ☐Yes ☐No

Do you have a history of depression? ☐Yes ☐No when?

Treated? ☐Yes ☐No Medication? ☐Yes ☐No

Did you have depression in previous pregnancy? ☐ Yes ☐ No when?

Treated? ☐Yes ☐No Medication? ☐Yes ☐No

Have you had postpartum depression? ☐Yes ☐No when?

Treated? ☐Yes ☐No Medication ☐Yes ☐No

Have you had any treatment for this present problem in the past? If so, please outline what the treatment was and when (including names of care providers and amounts of medications):

Have you had counseling in the past? ☐ Yes ☐ No

If yes, what for? ☐ depression ☐ relationship ☐ addiction ☐ eating disorder ☐ abuse
☐other

Are you seeing a counselor right now? ☐ Yes ☐ No

If yes, why? ☐ depression ☐ relationship ☐ addiction ☐ eating disorder ☐ abuse ☐other

Who is your counselor?

How would you rate your overall health today?

☐Fair ☐Poor

☐Excellent ☐Very Good ☐Good

How would you rate your overall mental health today?

☐Fair ☐Poor

☐Excellent ☐Very Good ☐Good

Anything else you would like us to know that will help us care for you?

IN THE LAST MONTH...

How much did you exercise? (walking for 20 minutes, swimming etc.)

Every day ☐
 2-3 times a week ☐
 Occasionally ☐
 Never ☐

How much did you smoke? (✓ one)

More than a pack/day ☐
 5-20/day ☐
 Less than 5 a day ☐
 Quit since pregnant ☐
 Quit before pregnant ☐
 I never smoked ☐

Does anyone else smoke inside your home? Yes ☐ No ☐

How often did you drink beer or other alcohol? (✓ all that apply)

Occasional drink or 2 ☐
 1-2 drinks a day ☐
 5+ drinks at one time ☐
 Quit since pregnant ☐
 Quit before pregnant ☐
 I never drank alcohol ☐

How often did you use drugs such as marijuana, Ritalin, morphine, crystal meth. IV drugs, Cocaine, gold paint? (✓ one)

Regular (every day) ☐
 Occasionally ☐
 Quit since pregnancy ☐
 Quit before pregnant ☐
 I never use such drugs ☐

Please circle a number for each item to show how much of a worry it is to you now, from 1 if it is not a worry to 5 if it is something that you are extremely worried about:

EVERYONE RESPOND TO THESE ITEMS		Not a worry		Major worry		
1.	Your housing	1	2	3	4	5
2.	Money problems	1	2	3	4	5
3.	Problems with the law	1	2	3	4	5
4.	Your relationship with your partner/husband	1	2	3	4	5
5.	Your relationship with your family and friends	1	2	3	4	5
6.	Your own health	1	2	3	4	5
7.	The health of someone close to you	1	2	3	4	5
8.	Employment problems	1	2	3	4	5
IF YOU ARE PREGNANT PLEASE RESPOND TO THE NEXT 8 ITEMS						
1.	The possibility of something being wrong with baby	1	2	3	4	5
2.	Going to hospital	1	2	3	4	5
3.	Internal examinations	1	2	3	4	5
4.	Giving birth	1	2	3	4	5
5.	Coping with the new baby	1	2	3	4	5
6.	Giving up work (if applicable)	1	2	3	4	5
7.	Whether your partner will be with you for the birth	1	2	3	4	5
8.	Possibility of miscarriage	1	2	3	4	5
IF YOU HAVE GIVEN BIRTH TO YOUR BABY PLEASE ANSWER THE NEXT 8 ITEMS:						
1.	Your baby's health now	1	2	3	4	5
2.	Your baby's long-term health	1	2	3	4	5
3.	Internal examinations	1	2	3	4	5
4.	Coping with the baby	1	2	3	4	5
5.	Reactions of older children to baby (if applicable)	1	2	3	4	5
6.	Going back to work (if applicable)	1	2	3	4	5
7.	Sex	1	2	3	4	5
8.	Another pregnancy too soon	1	2	3	4	5

If there is anything else that is worrying you or you would like to say anything more about any of the above, please tell us about it:

Please underline the answer, which comes closest to how you have felt in the past 7 days, not just how you feel today: **I have felt happy:**

Yes, most of the time
Yes, some of the time
No, not very often
No, not at all

In the past 7 days...

1. **I have been able to laugh and see the funny side of things:**
As much as I always could
Not quite so much now
Definitely not so much now
Not at all
2. **I have looked forward with enjoyment to things:**
As much as I ever did
Rather less than I used to
Definitely less than I used to
Hardly at all
3. **I have blamed myself unnecessarily when things went wrong:**
Yes, most of the time
Yes, some of the time
Not very often
No, never
4. **I have been anxious or worried for no good reason:**
No, not at all
Hardly ever
Yes, sometimes
Yes, very often
5. **I have felt scared or panicky for no very good reason:**
Yes, quite a lot
Yes, sometimes
No, not much
No, not at all
6. **Things have been getting on top of me:**
Yes, most of the time I haven't been able to cope at all
Yes, sometimes I haven't been coping as well as usual
No, most of the time I have coped quite well
No, I have been coping as well as ever
7. **I have been so unhappy that I have had difficulty sleeping:**
Yes, most of the time
Yes, sometimes
Not very often
No, not at all
8. **I have felt sad or miserable:**
Yes, most of the time
Yes, quite often
Not very often
No, not at all
9. **I have been so unhappy that I have been crying:**
Yes, most of the time
Yes, quite often
Only occasionally
No, never
10. **The thought of harming myself has occurred to me:**
Yes, quite often
Sometimes
Hardly ever
Never

Current Medications or over the counter drugs you are taking:

Medication	Reason	Amount	Frequency

Please describe any **health problems** you have had in the past (major illnesses, operations or accidents and if any effects are still present).

What grade did you finish?

- ☐ Grade 8 or less ☐ Grade 9 – 11 ☐ Grade 12
☐ Some post-secondary ☐ Post-secondary ☐ Some University ☐ University

Do you? ☐ own your home ☐ rent apt or home ☐ live with parents ☐ other _____

Plan to move: ☐ no ☐ yes

Are you? ☐ Caucasian ☐ Treaty –Status ☐ Non-Status ☐ Métis ☐ Other

Do you work outside the home? ☐ Yes ☐ No

If yes, what is your occupation? _____ # hours/week you work? _____

Do you have any financial concerns? ☐ Yes ☐ No

Your family income (✓ one only)

- ☐ Social/Band Assistance ☐ Less than \$20,000./yr ☐ \$20,000-39,000./yr
☐ \$40,000-59,000./yr ☐ More than \$60,000./yr ☐ rather not say

CONSENT FORM

Please read this consent from carefully, and feel free to ask questions you might have.

Researcher: Angela Bowen, College of Nursing, 306-966-8949.

Purpose and Procedure: We are evaluating the effectiveness of the Maternal Mental Health Program.

Potential Risks: There are no known risks to participating.

Potential Benefits: Although there may be no direct benefits these studies help to improve knowledge and treatment of these conditions in women like you.

Storage of Data: The information collected will remain in your confidential clinical file while you are active with the program. Research data that is collected will not bear your name and will be identified only by number and accessed only by the researchers. Research data will be stored separately on a password protected computer in a locked office for a minimum of 5 years within the College of Nursing, University of Saskatchewan.

Confidentiality: You will not be identified by name in research data or any reports to come out of the research. No individual information will be reported. Any data will be reported in an aggregate way. Information will remain as confidential as the law allows.

Right to Withdraw: You have the right to refuse to participate in research or not to have your information used for research at any time and this will in no way affect the clinical services that you receive. If you wish to withdraw, data will be deleted at your request.

Questions: If you have any questions you can contact Dr. Angela Bowen at the College of Nursing, 306-966-8949. Any questions regarding your rights as a participant may be addressed to that committee through the Ethics Office (306-966-2084). Out of town participants may call collect.

Consent to Participate:

I have read and understood the description provided above; I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate as described above and understand that I may withdraw this consent at any time. A copy of this consent form has been given to me for my records.

(Name of Participant)

(Date)

(Signature of Participant)

(Signature of Researcher or designate)

1. Would you be willing to be contacted in the future for us to follow your progress? Yes ☐ No ☐
2. Would you be willing to give the name and phone number of a relative or good friend who would be a contact and who will always knows where you are if you move?

Name

(Phone number)

(Signature of Participant)

(Signature of Researcher or designate)

THANK YOU!

APPENDIX B: Maternal Mental Health Program-Evaluation**Dear**

The Maternal Mental Health Program is new. We value your feedback in developing a program that meets the needs of other women. Please tell us your feelings and reactions about the following:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I would recommend the Maternal Mental Health Program (MMHP) to other women like me					
The MMHP met my expectations					
The location of the MMHP is convenient					
The staff understood my problems					
The staff explained my care to me					
The person who cared for me at the MMHP was thorough and competent					
The child care services met my needs					
The problem that brought me to the MMHP is improved as much as I hoped it would be					

Since you started attending the MMHP, did you start taking any medications? If yes, please fill in this table:

Medications	Reason	Amount	How often	Still taking it?

Since you started attending the MMHP, did you see anyone else outside the MMHP to help you with your symptoms? If yes, please check all those other people/programs that you received care from:

☐family doctor ☐psychiatrist ☐social worker ☐psychologist ☐private counsellor ☐spiritual counsellor
☐other_____

Since you started attending the MMHP, did you use any other therapies to try and decrease your depression or anxiety symptoms? Please tell us about them, did they help you?

The one thing I liked the most about the MMHP is:

The one thing I would change about the MMHP is:

Please underline the answer, which comes closest to how you have felt in the past 7 days, not just how you feel today:

Example:

I have felt happy:

Yes, most of the time
Yes, some of the time
 No, not very often
 No, not at all

6 Things have been getting on top of me:
 Yes, most of the time I haven't been able to cope at all
 Yes, sometimes I haven't been coping as well as usual
 No, most of the time I have coped quite well
 No, I have been coping as well as ever

In the past 7 days:

1 I have been able to laugh and see the funny side of things:
 As much as I always could
 Not quite so much now
 Definitely not so much now
 Not at all

7 I have been so unhappy that I have had difficulty sleeping:
 Yes, most of the time
 Yes, sometimes
 Not very often
 No, not at all

2 I have looked forward with enjoyment to things:
 As much as I ever did
 Rather less than I used to
 Definitely less than I used to
 Hardly at all

8 I have felt sad or miserable:
 Yes, most of the time
 Yes, quite often
 Not very often
 No, not at all

3 I have blamed myself unnecessarily when things went wrong:
 Yes, most of the time
 Yes, some of the time
 Not very often
 No, never

9 I have been so unhappy that I have been crying:
 Yes, most of the time
 Yes, quite often
 Only occasionally
 No, never

4 I have been anxious or worried for no good reason:
 No, not at all
 Hardly ever
 Yes, sometimes
 Yes, very often

10 The thought of harming myself has occurred to me:
 Yes, quite often
 Sometimes
 Hardly ever
 Never

5 I have felt scared or panicky for no very good reason:
 Yes, quite a lot
 Yes, sometimes
 No, not much
 No, not at all

11 If you have had your baby, the thought of harming my baby has occurred to me:
 Yes, quite often
 Sometimes
 Hardly ever
 Never

Do you have someone to turn to for emotional support? ☐ Yes ☐ No

If yes, who gives you support? ☐ Partner ☐ Mother ☐ Friend ☐ Female relatives ☐ Other _____

Who of these people gives you the most support? _____

Can you count on that person to care about you no matter what? ☐ Yes ☐ No

Everyone worries about things from time to time. With 1 being no worry and 5 being a major worry, please respond to these items

EVERYONE RESPOND TO THE FIRST 8 ITEMS	Not a worry		Major worry		
9. Your housing	1	2	3	4	5
10. Money problems	1	2	3	4	5
11. Problems with the law	1	2	3	4	5
12. Your relationship with your partner/husband	1	2	3	4	5
13. Your relationship with your family and friends	1	2	3	4	5
14. Your own health	1	2	3	4	5
15. The health of someone close to you	1	2	3	4	5
16. Employment problems	1	2	3	4	5
IF YOU ARE PREGNANT PLEASE RESPOND TO THE NEXT 8 ITEMS					
9. The possibility of something being wrong with baby	1	2	3	4	5
10. Going to hospital	1	2	3	4	5
11. Internal examinations	1	2	3	4	5
12. Giving birth	1	2	3	4	5
13. Coping with the new baby	1	2	3	4	5
14. Giving up work (if applicable)	1	2	3	4	5
15. Whether your partner will be with you for the birth	1	2	3	4	5
16. Possibility of miscarriage	1	2	3	4	5
IF YOU HAVE GIVEN BIRTH TO YOUR BABY PLEASE ANSWER THE NEXT 8 ITEMS:					
9. Your baby's health now	1	2	3	4	5
10. Your baby's long-term health	1	2	3	4	5
11. Some women tell us they have anxiety related to internal examinations	1	2	3	4	5
12. Coping with the baby	1	2	3	4	5
13. Reactions of older children to baby (if applicable)	1	2	3	4	5
14. Going back to work (if applicable)	1	2	3	4	5
15. Sex	1	2	3	4	5
16. Another pregnancy too soon	1	2	3	4	5

Do your moods go up and down?

- ☐ not at all ☐ occasionally ☐ several days a week ☐ more than ½ the days
☐ nearly every day

Do you have mood swings that occur for no reason?

- ☐ not at all ☐ occasionally ☐ several days a week ☐ more than ½ the days
☐ nearly every day

What other health care providers are you seeing now?

☐ Family Dr _____ ☐ Psychiatrist _____

☐ Counsellor _____ ☐ Other _____

Medications now	Reason	Amount	Frequency

If you have already had your baby, please answer these next 4 questions:

1. How old is your baby now? _____

2. How would you describe your baby's health?

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

3. On a scale of one to ten would you say your baby is an easy baby (to settle and care for, with 10 being the easiest baby you could imagine and 0 being very difficult to settle)?

0 1 2 3 4 5 6 7 8 9 10

4. Are you breastfeeding now? ☐ Yes ☐ No ☐ Both

Is there anything else you would like to tell us?

Thank you from the Maternal Mental Health Program

APPENDIX C: FAMILY PHYSICIAN SURVEY

Dear Doctor

We began our Maternal Mental Health Program (MMHP) in September of 2006 in conjunction with West Winds Primary Health Centre in Saskatoon. Please give your opinion on following questions.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Communication with MMHP staff is efficient and effective					
The wait time for my client to receive care from the MMHP is reasonable					
Referral to the MMHP is easier than to other mental health/psychiatry services					
I am aware that there is a psychologist, nurse therapist as well as a psychiatrist who I can make referrals to at the MMHP					
MMHP improved my knowledge of maternal mental health					
MMHP enhanced early detection of maternal mental health problems in my practice					
I feel more confident now treating women with maternal mental health issues					
The consultation response of MMHP provided enough information to allow me to care my patients					
Please rate the MMHP overall	Excellent	Very Good	Good	Average	Below average

1. What are your expectations of a program that treats pregnant or postpartum women with mental health issues?
2. How has the MMHP met these expectations?
3. Any suggestions for improvement?

LETTER TO THE DOCTOR

30 March, 2011

Doctor Address

Dear Dr.

The MMHP began in September of 2006 in conjunction with West Winds Primary Health Centre and the Department of Psychiatry to treat and assist physicians in caring for women with mental health disorders.

As someone who cares for perinatal women and who has referred patients to this program, we would value your input and comments on the program. **Please take a moment to complete the enclosed survey and return it to us in the self--- addressed, stamped envelope.**

Every effort will be made to assure that your comments remain anonymous; we ask that you print your name on the sticky note only so we are able to note that your survey was returned and not send further requests. Our research assistant will separate the sticky note upon receipt and your name will be checked off our list so you will not receive a follow---up call asking you to return the survey. Your name will also be entered into a draw for a box of Harden and Huyse chocolates.

Thank you for taking the time to complete the survey. Your comments will assist us in better serving the needs of your patients and all women in our community. If you have questions or concerns pertaining to the program or this evaluation, please do not hesitate to contact me at 966---8949 or angela.bowen@usask.ca.

Sincerely,

Angela Bowen RN, PhD
Associate Professor, College of Nursing
Associate Member, Department of Psychiatry